

This PDF is generated from: <https://www.aitesigns.co.za/Wed-08-Jan-2025-29530.html>

Title: Thin-film solar modules are translucent

Generated on: 2026-08-29 11:34:45

Copyright (C) 2026 AITESIGNS SOLAR. All rights reserved.

For the latest updates and more information, visit our website: <https://www.aitesigns.co.za>

In 2018, a review of the most pertinent transparent solar panel technologies concluded that the biggest riddles around transparent solar cell technologies will be resolved by 2023.

Partially transparent solar panels contain extremely thin slivers of crystalline (or thin-film) silicon photovoltaic (PV) material encased between layers of glass.

Partially transparent solar panels contain extremely thin slivers of crystalline (or thin-film) silicon photovoltaic (PV) material encased ...

Thin-film solar panels are a type of photovoltaic solar panels that are made up of one or more thin layers of PV materials. These thin, light-absorbing layers can be over 300 times thinner than a ...

Flexible and transparent thin-film silicon solar cells were fabricated and optimized for building-integrated photovoltaics and bifacial operation.

In this regard, this review aims to update the rapid development in the emerging thin-film TPVs, demonstrate versatile TPV applications in daily life, and assess the pros and ...

Learn about the different types of thin-film solar panels and how they differentiate on materials, cost, performance, and more.

Partially transparent solar panels, created using thin-film photovoltaics (TPVs), have an efficiency of about 7-10%, while fully transparent panels ...

Thin-film solar cells (TFSC) are manufactured using a single or multiple layers of PV elements over a surface comprised of a variety of glass, plastic, or metal.

Thin-film solar cells are a type of solar cell made by depositing one or more thin layers (thin films or TFs) of photovoltaic material onto a substrate, such as glass, plastic or metal.

In 2018, a review of the most pertinent transparent solar panel technologies concluded that the biggest riddles around transparent solar cell ...

What Is A Thin Film Solar Panel?Thin-Film Solar Panels vs. Traditional Panels: What's The difference?How Much Do Thin-Film Solar Panels Cost?What Are The Different Types of Thin-Film Solar Panel Technology?Pros and Cons of Thin-Film Solar PanelsBest Uses For Thin-Film Solar PanelsFinal Thoughts: Should You Buy Thin-Film Solar Panels?

Thin-film solar panels are a type of photovoltaic solar panels that are made up of one or more thin layers of PV materials. These thin, light-absorbing layers can be over 300 times thinner than a traditional silicon solar panel. Thin-film solar cells have built-in semiconductors, making them the solar panels the lightest panels av...See more on solarreviews .iacfm

.iacf_head{display:flex;align-items:center;gap:var(--smtc-gap-between-content-small);text-decoration-color:var(--smtc-foreground-content-neutral-primary);box-sizing:border-box;margin-bottom:var(--smtc-gap-between-content-x-small)}.iacfm .iacf_head span{flex:1 1

0;white-space:nowrap;text-overflow:ellipsis;overflow:hidden;color:var(--smtc-foreground-content-neutral-primary);font:var(--acf-font-title-1-strong)}.iacfm .iacf_head

div{display:flex;height:22px;width:22px;justify-content:center;align-items:center;transition:background 300ms

ease-out;margin-right:-3px;border-radius:var(--mai-smtc-corner-list-card-nested-default);overflow:hidden}.iacfm .iacf_head .iacf_chv{color:var(--smtc-foreground-content-neutral-primary)}[dir="rtl"] .iacfm .iacf_head

svg{transform:scaleX(-1)}.rel_ent_w{margin:4px 0 9px}.rel_ent_w.rel_ent_crs{margin:6px 0 16px}.b_top .rel_ent_w{margin-top:-4px}.b_top .rel_ent_w.rel_ent_crs{margin-top:0}.b_mm_swipable

.rel_ent_w{margin:4px 0 20px}.b_rich .rel_ent_w{margin:-3px -16px 8px}.rel_ent_w.rel_ent_scr:not(.rel_ent_crs){height:50px;overflow:hidden}.rel_ent_c{white-space:nowrap;overflow:hidden;padding-left:1px;height:50px}.aqptmt:not(.rel_ent_crs) .rel_ent_c{display:flex}.rel_ent_wp

.rel_ent_c{white-space:initial}.rel_ent_scr .rel_ent_c{overflow-y:hidden;-webkit-overflow-scrolling:touch;overflow-x:auto}.rel_ent_scr:not(.rel_ent_crs) .rel_ent_c{padding-bottom:12px}.b_mm_swipable

.rel_ent_c{padding-left:10px;margin-top:-2px;margin-bottom:4px}.b_rich .rel_ent_c{padding-left:15px}.rel_ent_w.rel_ent_crs .slide,.rel_ent_w.rel_ent_crs

.slide:hover{width:auto;height:42px;border-radius:20px!important;box-shadow:none!important;overflow:visible}a.rel_ent{display:inline-block;padding:0 16px 0 12px;margin:4px 8px 4px 0;border-radius:20px;border:1px solid

#ddd;text-decoration:none;overflow:hidden;height:40px;max-width:80vw}:not(#lgVidAnsContainer)>.aqptmt .rel_ent_c a.rel_ent{overflow:initial;display:flex}.slide a.rel_ent{margin:0;box-shadow:none}.b_slidebar .slide .rel_ent .cico,.rel_ent .cico,.rel_ent>img{display:inline-block;vertical-align:middle;margin:2px 8px 2px

-10px;border-radius:50%;background:#f7f7f7;flex-shrink:0}.rel_ent_tw{vertical-align:middle;font-size:12px;

```

color:#444;line-height:16px;height:100%;float:right;display:table}.rel_ent_t{display:table-cell;vertical-align:
middle;align-content:center}.aqptmt:not(.spl2) .rel_ent_tw,.aqptmt:not(.spl2) .rel_ent_tw
.rel_ent_t{overflow:hidden;text-overflow:ellipsis;white-space:nowrap}.aqptmt:not(.spl2)
.rel_ent_tw{display:flex;overflow:hidden;text-overflow:ellipsis;align-items:center;white-space:nowrap}.rel_e
nt_w:not(.spl2) .rel_ent_t strong{display:inline-block;font-weight:normal}#b_results phead
.b_attribution{padding-bottom:8px}.iaplanner .b_moreLink{margin-top:11px}.iaplanner.iarnd
.b_moreLink{margin-top:3px}.b_ans .b_rich pserp.b_mBMargin{padding:0;border-top:0}.b_ans #vidans2
.b_rich .rel_ent_w{margin:6px 0 16px}.aqptmt a.rel_ent{border-color:#106ebe}.aqptmt:not(.spl2)
.rel_ent_tw,.aqptmt:not(.spl2) .rel_ent_tw
.rel_ent_t{font-size:16px}.b_slideexp{margin-bottom:20px;position:relative}.b_ans>.b_slideexp>.slide:last-c
hild,.b_ans>.b_slideexp:last-child,.b_vPanel
.b_slideexp:last-child{margin-bottom:0;padding-bottom:0}.b_slidebar
.slide{display:inline-block;vertical-align:top}.b_slidebar .slide,.b_slideexp
.b_viewport{overflow:hidden}.b_slideexp
.b_viewport{margin:auto}.b_slidebar{white-space:nowrap}.b_slidebar
.slide{white-space:normal;position:relative}.b_cards .cico,.b_slidebar .slide
.cico{border-radius:0}.b_slidebar,.b_slidebar .slide{width:100%}.b_slidebar.anim{transition:margin-left .35s
cubic-bezier(.15,.85,.35,1)}.slide>.spinner{position:absolute;left:50%}.slide>.spinner>
ner{position:relative;left:-50%;width:40px;height:40px;background:url(/rp/OJWYLxkTdSOmE7-V53KpAdO
j-xY.gif) no-repeat;margin:40px auto
30px;z-index:1000}.slide_mask.hideSlideMask{visibility:hidden}.b_slidebar.b_autoslidingfade
.slide.slide_fading{opacity:1}.slide_mask,.b_slidebar.b_autoslidingfade .slide{transition:opacity .3s
linear}.slide_mask.slide_fading,.b_slidebar.b_autoslidingfade
.slide{opacity:0}.slide_mask{position:absolute;width:100%;height:100%;opacity:.7;top:0}.carousel_seemore{
text-align:center}.carousel_seemore.dark a{color:#fff}.b_slidebar.enable_selecting
.slide.selected::after,.b_slidebar.enable_selecting .slide:hover::after{box-shadow:inset 0 0 0 2px
#fff}.b_slidebar .slide.selected::after,.b_slidebar .slide:focus::after{box-shadow:inset 0 0 0 2px
#0099bc;outline:0}.b_slidebar.enable_selecting .slide.selected::after,.b_slidebar.enable_selecting
.slide:hover::after,.b_slidebar .slide.selected::after,.b_slidebar
.slide:focus::after{content:"";height:100%;width:100%;position:absolute;left:0;top:0}.b_slideexp
.b_antiSideBleed{display:inline-block}.carousel_seemore>.b_moreLink.rndChev{vertical-align:middle;height
:92px;text-decoration-color:#444;display:inline-block}.carousel_seemore
.seeAll_txt{display:block;color:#444;line-height:17px}.carousel_seemore
.seeAll_chev{display:block;height:48px;padding-bottom:12px;margin-top:15px}html[dir="rtl"]
.carousel_seemore .seeAll_chev{transform:scaleX(-1)}.b_slideexp
.b_viewport.scrollbar{overflow-x:auto;-ms-overflow-style:none;scrollbar-width:none}.b_slideexp
.b_viewport.scrollbar::-webkit-scrollbar{display:none}.b_slideexp
.b_viewport{-webkit-overflow-scrolling:touch}.b_overlay
.btn.rounded{position:absolute;cursor:pointer;z-index:1;-moz-user-select:none;-khtml-user-select:none;-webki
t-user-select:none;-o-user-select:none;-ms-user-select:none;user-select:none}.b_overlay

```

.btn.rounded,.b_overlay .btn.rounded .bg,.b_overlay .btn.rounded .cr,.b_overlay .btn.rounded
.cr>div,.b_overlay .btn.rounded .vcac>div{border-radius:50%}.b_overlay .btn.rounded
.vcac{height:0}.b_overlay .btn.rounded{height:32px;width:32px;top:50%;margin-top:-16px}.b_overlay
.btn.rounded .bg,.b_overlay .btn.rounded:hover .bg{opacity:0}.b_overlay .btn.rtl.rounded
.cr{direction:ltr}.b_overlay .btn.hidden.rounded .cr,.b_overlay .btn.disabled.rounded
.cr{visibility:hidden}.b_overlay .btn.rounded .cr>div{border:1px solid #ecec;box-shadow:0 2px 3px 0
rgba(0,0,0,.1);height:30px;width:30px;overflow:hidden;background-image:none;background-color:#fff}.b_ov
erlay .btn.rounded .cr>div:hover{box-shadow:0 2px 4px 1px rgba(0,0,0,.14)}.b_overlay .btn.rounded
.cr>div:after{bottom:5px;background-color:#fff;transform-origin:-430px
0;display:inline-block;transform:scale(.5);position:relative}.b_overlay .btn.rounded
.cr>div:hover:after{transform-origin:-514px 0}.b_overlay .btn.ltr.rounded .cr>div:after{right:5px}.b_overlay
.btn.rtl.rounded .cr>div:after{left:5px}.b_overlay .btn.prev.ltr.rounded .cr,.b_overlay .btn.next.rtl.rounded
.cr{transform:scaleX(-1)}body .b_overlay .btn.rounded.next{right:-12px}body .b_overlay
.btn.rounded.prev{left:-13px}.ra_car_container .b_overlay .btn.prev.ltr.rounded .cr>div,.ra_car_container
.b_overlay .btn.next.rtl.rounded .cr>div{transform:unset}.ra_car_container .b_overlay .btn.rounded
.cr>div{background-position:0;border:unset}.ra_car_container .b_overlay .btn.rounded
.cr>div:after{content:unset}@media screen and (forced-colors:active){.b_overlay .btn.rounded.hidden
*,.b_overlay .btn.rounded.disabled *{background:none}.b_overlay .btn.rounded.hidden,.b_overlay
.btn.rounded.disabled{background:none}}.b_overlay .btn.rounded
.cr>div:after{content:url(/rp/EX_mgILPdYtFnI-37m1pZn5YKII.png)}.b_overlay{position:relative}.vcac{posi
tion:absolute;width:100%;top:50%}.vcac>div{position:relative;width:100%}#b_content .iacfic.mmkiaacf
.iacfmit .imgInfo{color:var(--smtc-ctrl-link-foreground-brand-rest)}#b_content .iacfic.mmkiaacf .iacfmit
a{text-decoration-color:var(--smtc-ctrl-link-foreground-brand-hover)}#b_content .iacfic.mmkiaacf .iacfmit
.imgInfo{font:var(--bing-smtc-text-global-body3)}#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel]>div[data-wptds-carousel-scroll-container]{padding-bottom:52px}#b_content
.iacfic.mmkiaacf .iacfmit{box-sizing:initial;padding-bottom:52px}#b_content .iacfic.mmkiaacf .iacfmit
.imgInfo{text-overflow:ellipsis;display:-webkit-box;-webkit-line-clamp:2;-webkit-box-orient:vertical;align-sel
f:stretch;padding:0 var(--smtc-gap-between-content-xx-small);overflow:hidden}#b_content .iacfic.mmkiaacf
.iacfimgc{padding-bottom:var(--smtc-gap-between-content-x-small)}#b_content .acfImgAns
.salink,#b_content .acfImgAns
.iasalink{text-align:center;display:block;padding-bottom:var(--smtc-gap-between-content-medium)}#b_conte
nt .acfImgAns .salink:hover .iasabt,#b_content .acfImgAns .iasalink:hover
.iasabt{background:var(--bing-smtc-background-ctrl-outline-hover)}#b_content .acfImgAns .salink:active
.iasabt,#b_content .acfImgAns .iasalink:active
.iasabt{background:var(--bing-smtc-background-ctrl-outline-pressed)}#b_content .acfImgAns
.iasabt,#b_content .acfImgAns
.iaExp_chevron{height:initial;border-radius:var(--smtc-corner-circular);background:var(--bing-smtc-backgrou
nd-ctrl-neutral-rest);display:inline-block;position:relative;top:0;box-shadow:initial}#b_content .acfImgAns
.iasatxt{font:var(--bing-smtc-text-global-caption1-strong);color:var(--bing-smtc-foreground-content-brand-res
t);padding:var(--smtc-gap-between-content-x-small)}

```

var(--smtc-gap-between-content-small);display:flex;gap:var(--smtc-gap-between-content-x-small);justify-content:center;align-items:center}#b_content .acfImgAns .salink::before,#b_content .acfImgAns .iasalink::before{border-bottom:1px solid var(--smtc-stroke-ctrl-on-neutral-rest);width:100%;display:block;content:"";top:18px;position:relative}#b_content .acfImgAns .svg{vertical-align:top}#b_content .acfImgAns .svgpath{fill:var(--bing-smtc-foreground-content-brand-rest)}#b_content .acfImgAns .iachevron,#b_content .acfImgAns .svgicon{width:12px;height:12px;margin-left:0;position:relative;top:0}html[dir=rtl] #b_content .acfImgAns .iachevron,html[dir=rtl] #b_content .acfImgAns .svgicon{transform:scaleX(-1)}#b_content .acfImgAns .rel_ent_w a.rel_ent{border:1px solid var(--acf-stroke-neutral-decorative)}#b_content .acfImgAns .iaheader .iacf_head{text-decoration-color:var(--smtc-foreground-ctrl-neutral-primary-hover)}#b_content .acfImgAns .iaheader .iacf_head span,#b_content .acfImgAns .iaheader .iacf_head svg{color:var(--smtc-foreground-content-neutral-primary);forced-color-adjust:auto}#b_content .iacfic.mmkiaacf .iacf_plan .cico{border-radius:var(--smtc-corner-card-rest)}#b_content .iacfic.mmkiaacf .iacf_plan .cico img{border-radius:var(--smtc-corner-card-rest)}#b_content .iacfic.mmkiaacf{overflow:visible;padding:0}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel{margin:0;padding-bottom:var(--smtc-gap-between-content-medium)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel[controls]{--wptds-carousel-control-opacity:1}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel>div{padding:0}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel[data-direction="end"]{margin-right:-22px}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel[data-direction="end"] svg{transform:scaleX(-1)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel[data-direction="start"]{margin-left:-22px}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel[data-direction="start"] svg{transform:scaleX(1)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel button{background:var(--smtc-background-card-on-primary-default-rest);box-shadow:var(--acf-elevation-3);width:36px;border-radius:var(--smtc-corner-ctrl-lg-rest)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel button:hover{background:var(--smtc-background-card-on-primary-default-hover)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel button:active{background:var(--smtc-background-card-on-primary-default-pressed)}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel button svg{transition:initial}#b_content .iacfic.mmkiaacf .iacf_crsldata-wptds-carousel button svg path{fill:var(--smtc-foreground-content-neutral-secondary);forced-color-adjust:auto}#b_content .iacfic.mmkiaacf .iacfmit{position:absolute}#b_content .iacfic.mmkiaacf .iacfimgc{margin:auto}#b_content .b_ans.b_imgansacf{padding:0!important}#b_content .b_ans.b_top.b_imgansacf{background-color:initial!important}#b_content .acfImgAns .iaheader .iacf_head{gap:0;padding:var(--smtc-gap-between-content-medium) 0;display:flex;align-items:center;box-sizing:border-box}#b_content .acfImgAns .iaheader .iacf_head:hover{text-decoration:none}#b_content .acfImgAns .iaheader .iacf_head:hover span{text-decoration:underline}#b_content .acfImgAns .iaheader .iacf_head:hover .iacf_chv{background:initial}#b_content .acfImgAns .iaheader .iacf_head

```

```
div{display:flex;align-items:center;transition:background 300ms
ease-out;margin-right:-3px;border-radius:var(--smtc-corner-ctrl-rest);overflow:hidden;color:var(--bing-smtc-f
oreground-content-neutral-secondary-alt)}#b_content .acfImgAns .iaheader .iacf_head
span{width:initial;flex:none;font:var(--bing-smtc-text-global-subtitle1-strong);padding-inline-start:var(--mai-s
mtc-padding-card-default);max-width:90%;text-overflow:ellipsis;white-space:nowrap;overflow:hidden}#b_co
ntent .acfImgAns .iaheader .iacf_head .iacf_chv{width:22px;justify-content:center;height:22px}#b_content
.acfImgAns .rel_ent_w{margin-top:0}#b_content .acfImgAns .rel_ent_w .b_slideexp{margin:0}#b_content
.acfImgAns .rel_ent_w .btn.rounded{top:initial;margin-top:1px}#b_content .acfImgAns .rel_ent_w
.btn.next{right:-14px}#b_content .acfImgAns .rel_ent_w
.cr>div{width:36px;height:38px;border-radius:var(--smtc-corner-ctrl-lg-rest);background:var(--bing-smtc-bac
kground-container);box-shadow:var(--acf-elevation-3);border:initial}#b_content .acfImgAns .rel_ent_w
.cr>div:after{margin-inline-start:2px;top:0}#b_content .acfImgAns .rel_ent_w
.b_viewport{padding-top:0;margin-left:0;padding-left:0}#b_content .acfImgAns .rel_ent_w .b_viewport
.slide{height:38px;margin-left:0;margin-inline-end:var(--smtc-gap-between-content-x-small)}#b_content
.acfImgAns .rel_ent_w
a.rel_ent{border-radius:var(--smtc-corner-circular);background:var(--smtc-background-card-on-primary-defau
lt-rest);padding-left:0;height:38px}#b_content .acfImgAns .rel_ent_w
a.rel_ent:hover{background:var(--smtc-background-card-on-primary-default-hover)}#b_content .acfImgAns
.rel_ent_w a.rel_ent:active{background:var(--smtc-background-card-on-primary-default-pressed)}#b_content
.acfImgAns .rel_ent_w .cico{margin:var(--smtc-gap-between-content-xx-small)
var(--smtc-gap-between-content-x-small) var(--smtc-gap-between-content-xx-small)
var(--smtc-gap-between-content-xx-small)}#b_content .acfImgAns .rel_ent_w
.rel_ent_tw{font:var(--bing-smtc-text-global-caption1-strong)}#b_content .acfImgAns .rel_ent_w
.rel_ent_c{padding-left:0}#b_content .acfImgAns .rel_ent_w
.b_slidebar{padding-inline-start:var(--mai-smtc-padding-card-default)}#b_content .acfImgAns .rel_ent_w
.rel_ent_c
.rel_ent:first-child{margin-inline-start:var(--mai-smtc-padding-card-default);align-items:center}#b_content
.acfImgAns .rel_ent_w .rel_ent_t{max-width:250px}html[dir=rtl] #b_content .acfImgAns .iaheader .iacf_head
svg{transform:scaleX(-1)}html[dir=rtl] #b_content .acfImgAns .iacf_crs1[data-wptds-carousel]
[data-direction="end"]{transform:scaleX(-1)}html[dir=rtl] #b_content .acfImgAns
.iacf_crs1[data-wptds-carousel] [data-direction="start"]{transform:scaleX(-1)}.iacfm .iacfmit a:focus
.isp_imgcont img,.iacfm .iacfmit a:focus .iacfimgc img,.iacfm .iacfmit a:focus .iacf_smol{outline:3px dotted
#1aebff;outline-offset:-5px}.iacfm .iacfmit .cico{position:relative}.iacfm .iacfmit
.cico::after{content:"";position:absolute;left:0;top:0;width:100%;height:100%;background:rgba(0,0,0,.03)}.gs
_card .iacfmit img,.b_wpt_container .iacfmit img,.b_acf_card .iacfmit img{transition:transform .3s
ease-out}.gs_card .iacfmit:hover .iacfimgc img,.b_wpt_container .iacfmit:hover .iacfimgc img,.b_acf_card
.iacfmit:hover .iacfimgc
img{transform:scale(1.1)}.iacfic{position:relative;height:100%;width:100%;background:#fff;overflow:hidden
;border-radius:inherit}.iacf_plan{position:relative}.iacfmit
.mimg{width:100%;height:100%;position:relative}.iacfic .iacfmit{position:absolute}.iacfic .iacfmit
```



```
.cico{border-radius:0}.iacfca{padding:var(--mai-smtc-padding-card-default);box-sizing:border-box;overflow:
hidden;border-radius:var(--smtc-corner-card-rest)}.iacfca .iacf_crs1
.iacfmit{overflow:hidden;position:relative}.iacfca .iacf_crs1 .iacfmit
.cico{overflow:hidden;border-radius:var(--mai-smtc-corner-list-card-nested-default)}.iacfca .iacf_crs1 .iacfmit
.cico img{border-radius:inherit;transition:transform 300ms ease-out}.iacfca .iacf_crs1 .iacfmit:hover .cico
img{transform:scale(1.1)}.iacfca .iacfmit a:focus,.iacfca .iacfmit a:focus img{outline:0}.iacfca .iacfmit
a:focus .cico::after{border-radius:inherit;box-shadow:inset 0 0 0 3px
var(--bing-smtc-background-card-on-primary-alt-rest);outline:2px solid
var(--smtc-foreground-content-neutral-secondary);outline-offset:-2px}.iacfca
[data-wptds-carousel][data-default][data-variant="Normal"]{margin:0
calc(-1*var(--mai-smtc-padding-card-default));height:auto}.iacfca
[data-wptds-carousel][data-default][data-variant="Normal"] [data-wptds-carousel-scroll-container]{padding:0
var(--mai-smtc-padding-card-default)}.iacfca [data-wptds-carousel][data-default][data-variant="Normal"]
[data-wptds-carousel-scroll-container] ol{width:fit-content;align-items:center}.iacfca
[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="end"]{margin-right:24px}.iacfca
[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="start"]{margin-left:24px}.iacfca
.iacf_pag{position:absolute;bottom:8px;left:50%;transform:translate(-50%,0)}.cards.large
.iacfca{height:200px}[dir="rtl"] .iacfca .iacf_pag{transform:translate(50%,0)}.iacfm.iacfca
.iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control]{background:var(--bing-smtc-background-ctrl-neutral-rest);border:0;height:56px
;width:16px;transition:width .3s;background
.3s;color:var(--smtc-foreground-ctrl-neutral-primary-hover)}.iacfm.iacfca .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control] svg{transition:transform .3s}.iacfm.iacfca .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control]:hover{width:24px;background:var(--smtc-background-ctrl-neutral-hover)}.iacf
m.iacfca .iacf_crs1[data-wptds-carousel] [data-wptds-carousel-control] path{fill:currentColor}.iacfm.iacfca
.iacf_crs1[data-wptds-carousel] ol [data-direction="start"]{border-radius:0 8px 8px
0;margin-left:16px}.iacfm.iacfca .iacf_crs1[data-wptds-carousel] ol [data-direction="start"]
svg{transform:scale(.7)}.iacfm.iacfca .iacf_crs1[data-wptds-carousel] ol [data-direction="start"]:hover
svg{transform:scale(1)}.iacfm.iacfca .iacf_crs1[data-wptds-carousel] ol
[data-direction="end"]{border-radius:8px 0 0 8px;margin-right:16px}.iacfm.iacfca
.iacf_crs1[data-wptds-carousel] ol [data-direction="end"] svg{transform:scale(-.7)}.iacfm.iacfca
.iacf_crs1[data-wptds-carousel] ol [data-direction="end"]:hover svg{transform:scale(-1)}.iacfm.iacfca.iacf_fb
.iacf_crs1[data-wptds-carousel] [data-wptds-carousel-control],.iacfm.iacfca.iacf_ss
.iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control]{background:var(--mai-smtc-background-ctrl-on-image-rest);color:var(--mai-sm
tc-foreground-ctrl-on-image-rest)}.iacfm.iacfca.iacf_fb .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control] path,.iacfm.iacfca.iacf_ss .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control] path{fill:currentColor}.iacfca .iacf_colg_crs1
```

```
[data-wptds-carousel-list]{width:fit-content}.iacfca .iacf_colg_crsI .iacfmit{position:absolute}.iacfca
.iacf_colg_crsI
.cico{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crsI){height:100%;width:100%;padding:0;overflow:
hidden;border-radius:inherit}.iacfca:not(.iacfh):has(>.iacf_colg_crsI)
.iacfmit{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crsI) [data-wptds-carousel][data-default]
[data-wptds-carousel-controls]{inline-size:calc(100% + var(--wptds-carousel-control-size) -
var(--mai-smtc-padding-card-default)*2);transform:translateX(calc(0rem +
var(--mai-smtc-padding-card-default) - (var(--wptds-carousel-control-size)/2)))
translateY(-50%)}[data-wptds-carousel][data-default],[data-wptds-carousel][data-default]::before,[data-wptds-
carousel][data-default]::after,[data-wptds-carousel][data-default] *,[data-wptds-carousel][data-default]
*::before,[data-wptds-carousel][data-default]
*::after{box-sizing:border-box;margin:0;padding:0}[data-wptds-carousel][data-default][hidden],[data-wptds-c
arousel][data-default]
[hidden]{display:none}[data-wptds-carousel][data-default][data-visually-hidden],[data-wptds-carousel][data-d
efault] [data-visually-hidden]{block-size:.0625rem;border:0;clip:rect(0 0 0
0);inline-size:.0625rem;margin:-.0625rem;overflow:hidden;padding:0;position:absolute}[data-wptds-carousel]
[data-default]{--wptds-carousel-control-bg-color:#fff;--wptds-carousel-control-border-color:#ddd;--wptds-car
ousel-control-box-shadow:0rem .125rem .1875rem rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#767676;--wptds-carousel-control-size:2rem;display:block;po
sition:relative;block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]{overflow-x:auto;overflow-y:clip;scroll-behavior:smooth;block-size:10
0%;-ms-overflow-style:none;scrollbar-width:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]::-webkit-scrollbar{display:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]:focus-visible{outline-color:Highlight;outline-color:-webkit-focus-ring-
color;outline-offset:.0625rem;outline-style:auto;outline-width:.0625rem}[data-wptds-carousel][data-default]
[data-wptds-carousel-list]{display:flex;gap:.5rem;list-style:none;block-size:100%}[data-wptds-carousel][data-
default] [data-wptds-carousel-list]> *{flex-grow:0;flex-shrink:0}[data-wptds-carousel][data-default]
[data-wptds-carousel-list]>:not([data-wptds-carousel-item]){display:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]{block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]> *{block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]>img{display:block;inline-size:auto}[data-wptds-carousel][data-default]
[data-wptds-carousel-controls]{list-style:none;position:absolute;inline-size:calc(100% +
var(--wptds-carousel-control-size));inset-block-start:50%;transform:translateX(calc(0rem -
(var(--wptds-carousel-control-size)/2)))
translateY(-50%);display:flex;align-items:center;justify-content:space-between;pointer-events:none}[data-wpt
ds-carousel][data-default]
[data-wptds-carousel-controls]> *{flex-grow:0;flex-shrink:0}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]{cursor:pointer;inline-size:var(--wptds-carousel-control-size);aspect-ratio:1;displ
ay:grid;place-content:center;border-radius:50%;background-color:var(--wptds-carousel-control-bg-color);bord
er:.0625rem solid
```



```
var(--wptds-carousel-control-border-color);box-shadow:var(--wptds-carousel-control-box-shadow);color:var(--wptds-carousel-control-fg-color);opacity:var(--wptds-carousel-control-opacity);pointer-events:all}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]:active{--wptds-carousel-control-bg-color:#fff;--wptds-carousel-control-border-color:#ddd;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#767676}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]:focus-visible{outline-color:Highlight;outline-color:-webkit-focus-ring-color;outline-offset:.0625rem;outline-style:auto;outline-width:.0625rem}[data-wptds-carousel][data-default]
[data-wptds-carousel-control] *{pointer-events:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]>svg{display:block}[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="start"]>svg{transform:scaleX(1)}[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="end"]>svg{transform:scaleX(-1)}[data-wptds-carousel][data-default]
[data-wptds-carousel-control][aria-disabled="true"]{visibility:hidden;cursor:not-allowed}[data-wptds-carousel][data-default]
[data-wptds-carousel-announce]{block-size:.0625rem;border:0;clip:rect(0 0 0 0);inline-size:.0625rem;margin:-.0625rem;overflow:hidden;padding:0;position:absolute}[data-wptds-carousel][data-default][data-variant="Normal"],[data-wptds-carousel][data-default][data-variant="FullWidth"]{--wptds-carousel-control-opacity:0}[data-wptds-carousel][data-default][data-variant="Normal"]:has([data-wptds-carousel-scroll-container]:focus-visible),[data-wptds-carousel][data-default][data-variant="Normal"]:has([data-wptds-carousel-control]:focus-visible),[data-wptds-carousel][data-default][data-variant="FullWidth"]:has([data-wptds-carousel-scroll-container]:focus-visible),[data-wptds-carousel][data-default][data-variant="FullWidth"]:has([data-wptds-carousel-control]:focus-visible){--wptds-carousel-control-opacity:1}[data-wptds-carousel][data-default][data-variant="Normal"][data-snap] [data-wptds-carousel-scroll-container]{scroll-snap-type:x proximity}[data-wptds-carousel][data-default][data-variant="Normal"][data-snap]
[data-wptds-carousel-item]{scroll-snap-align:center;scroll-snap-stop:always}[data-wptds-carousel][data-default][data-variant="Normal"][data-snap]
[data-wptds-carousel-item]:first-of-type{scroll-snap-align:start}[data-wptds-carousel][data-default][data-variant="Normal"][data-snap]
[data-wptds-carousel-item]:last-of-type{scroll-snap-align:end}[data-wptds-carousel][data-default][data-variant="FullWidth"] [data-wptds-carousel-scroll-container]{scroll-snap-type:x mandatory}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]{inline-size:100%;scroll-snap-align:center;scroll-snap-stop:always}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]:first-of-type{scroll-snap-align:start}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]:last-of-type{scroll-snap-align:end}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]>*{inline-size:100%}[data-wptds-carousel][data-default][data-bleed-inline]
[data-wptds-carousel-controls]{--control-side-gap:.25rem;inline-size:calc(100% -
```

```
(var(--control-side-gap)*2));transform:translateX(calc(0rem + var(--control-side-gap)))
translateY(-50%))[data-wptds-carousel][data-desktop]
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active){--wptds-carousel-control-bg-color:
:fff;--wptds-carousel-control-border-color:#ddd;--wptds-carousel-control-box-shadow:0rem .125rem
.3125rem
rgba(0,0,0,.14);--wptds-carousel-control-fg-color:#111}[data-wptds-carousel][data-desktop][data-variant="No
rmal"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="N
ormal"]:has([data-wptds-carousel-control]:hover),[data-wptds-carousel][data-desktop][data-variant="FullWidt
h"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="Full
Width"]:has([data-wptds-carousel-control]:hover){--wptds-carousel-control-opacity:1}[dir="rtl"]
[data-wptds-carousel][data-default] [data-wptds-carousel-controls]{transform:translateX(calc(0rem +
(var(--wptds-carousel-control-size)/2))) translateY(-50%))[dir="rtl"] [data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="start"]>svg{transform:scaleX(-1)}[dir="rtl"]
[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="end"]>svg{transform:scaleX(1)}[dir="rtl"]
[data-wptds-carousel][data-default][data-bleed-inline]
[data-wptds-carousel-controls]{transform:translateX(calc(0rem - var(--control-side-gap)))
translateY(-50%)).b_dark [data-wptds-carousel][data-default],.b_drk
[data-wptds-carousel][data-default]{--wptds-carousel-control-bg-color:#484644;--wptds-carousel-control-bord
er-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#d2d0ce}.b_dark [data-wptds-carousel][data-default]
[data-wptds-carousel-control]:active,.b_drk [data-wptds-carousel][data-default]
[data-wptds-carousel-control]:active{--wptds-carousel-control-bg-color:#484644;--wptds-carousel-control-bor
der-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#d2d0ce}.b_dark [data-wptds-carousel][data-desktop]
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active),.b_drk
[data-wptds-carousel][data-desktop]
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active){--wptds-carousel-control-bg-color:
#605e5c;--wptds-carousel-control-border-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem
.3125rem rgba(0,0,0,.14);--wptds-carousel-control-fg-color:#faf9f8}.gs_card .iacfic .iacfmit
.iacfimgc,.gs_card .iacfic .iacfmit .cico,.b_wpt_container .iacfic .iacfmit .iacfimgc,.b_wpt_container .iacfic
.iacfmit .cico{width:100%!important;height:100%!important;border-radius:0}.gs_card .iacfic .iacfmit.iacfstc
img,.gs_card .iacfic .iacfmit .iacfimgc img,.b_wpt_container .iacfic .iacfmit.iacfstc img,.b_wpt_container
.iacfic .iacfmit .iacfimgc img{width:100%;height:100%;object-fit:cover}#slideexp0_777559 .slide {
margin-right: 8px; }#slideexp0_777559c .b_slidebar .slide { border-radius: 6px; }#slideexp0_777559
.slide:last-child { margin-right: 1px; }#slideexp0_777559c { margin: -4px; } #slideexp0_777559c .b_viewport
{ padding: 4px 1px 4px 1px; margin: 0 3px; } #slideexp0_777559c .b_slidebar .slide { box-shadow: 0 0 0 1px
rgba(0, 0, 0, 0.05); -webkit-box-shadow: 0 0 0 1px rgba(0, 0, 0, 0.05); } #slideexp0_777559c .b_slidebar
.slide.see_more { box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00); -webkit-box-shadow: 0 0 0 0px rgba(0, 0, 0,
0.00); } #slideexp0_777559c .b_slidebar .slide.see_more .carousel_seemore { border: 0px;
```

```
#slideexp0_777559c .b_slidebar .slide.see_more: hover { box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00);
-webkit-box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00); }Images of Thin-Film Solar modules Are
TranslucentTranslucent Solar PanelsTransparent Thin Film Solar PanelsTranslucent Photovoltaic PanelsThin
Film Solar Panel ImagesThin Film Solar TechnologyThin Film Amorphous Solar PanelsThinfilm Solar
PanelThin Film Solar PanelsSemi Transparent Solar CellsThin-Film Solar Panels: Everything to KnowThin
Film Solar Panels - All You Need To Know - Solar FastExplore how Thin-Film Solar Panels Work -
OFFGRIDDRThin-Film Solar Panels: Everything to KnowThin-Film Solar Panels: What Are They and Who
Uses Them?Thin Film Solar Panels - All You Need To Know - Solar FastThin film solar modules - tesaWhat
Are Thin-Film Solar Panels? - Sistine SolarSee
all.b_wikiRichcard_noHeroSection{content-visibility:auto;contain-intrinsic-size:1px 218px}#b_results
.b_wikiRichcard p{display:inline}.b_wikiRichcard .b_promoteText{font-weight:bold}.b_wikiRichcard
.tab-head{margin-bottom:var(--smtc-gap-between-content-x-small)}#b_results>li .b_wikiRichcard
.wikiRichcard_heroSection{padding-bottom:var(--smtc-gap-between-content-small)}#b_results>li
.b_wikiRichcard .wikiRichcard_heroSection
p{color:var(--bing-smtc-foreground-content-neutral-secondary-alt)}#b_results>li .b_wikiRichcard .tab-content
p,#b_results>li .b_wikiRichcard .tab-content
a{color:var(--smtc-ctrl-rating-icon-foreground-filled)}#b_results>li .b_wikiRichcard .tab-container
a{border-bottom:1px dashed var(--smtc-stroke-ctrl-on-neutral-rest)}#b_results>li .b_wikiRichcard
a.b_mopexpref{border-bottom:0}#b_results>li .b_wikiRichcard
line>a: hover{background-color:transparent;text-decoration:none}#b_results>li .b_wikiRichcard
a[href*="wikipedia "],#b_results>li .b_wikiRichcard a[href*="wikipedia "]:hover,#b_results .b_wikiRichcard
.wiki_attr a,#b_results .b_wikiRichcard .wiki_attr a: hover{border-bottom:0}#b_results>li .b_wikiRichcard
a[href*="wikipedia "]:hover,#b_results .b_wikiRichcard .wiki_attr
a: hover{text-decoration:underline;background-color:var(--smtc-background-card-on-primary-default-rest)}#b
_results>li .b_wikiRichcard_noHeroSection .b_wikiRichcard
p{color:var(--bing-smtc-foreground-content-neutral-secondary-alt);display:-webkit-box;-webkit-line-clamp:5;
-webkit-box-orient:vertical;overflow:hidden;padding-bottom:0}.b_wikiRichcard_noHeroSection .b_imagePair
.b_wikiRichcard_image{float:right;margin-top:var(--smtc-padding-ctrl-text-side)}.b_wikiRichcard_noHeroSe
ction .b_wikiRichcard
.b_clearfix.b_overflow{line-height:var(--mai-smtc-padding-card-default)}.b_wikiRichcard_noHeroSection
.b_imagePair .b_wikiRichcard_image_caption{margin-right:110px}.b_wikiRichcard_noHeroSection
.b_imagePair .sml{display:none}#b_results li.b_algoBigWiki: hover h2
a{text-decoration:underline}.b_wikiRichcard_noHeroSection .b_floatR_img{padding:0 0
var(--smtc-gap-between-content-x-small)
var(--smtc-gap-between-content-x-small)}.b_wikiRichcard_noHeroSection{margin-top:var(--smtc-gap-betwe
en-content-x-small);margin-bottom:var(--smtc-gap-between-content-xx-small);box-sizing:border-box}#b_con
tent #b_results .b_algo .b_wikiRichcard .tab-head .tab-menu
li.tab-active{box-shadow:none;background:var(--bing-smtc-background-ctrl-subtle-pressed);border-radius:var
(--mai-smtc-corner-list-card-nested-default);color:var(--bing-smtc-foreground-content-brand-rest)}#b_content
#b_results .b_algo .b_wikiRichcard:not(:has(.tab-navr)) .tab-head .tab-menu
```

```
li:hover{background:var(--smtc-background-ctrl-neutral-hover);color:var(--bing-smtc-foreground-content-brand-rest);border-radius:var(--mai-smtc-corner-list-card-nested-default)}.b_wikiRichcard .tab-head .tab-menu
ul{gap:var(--smtc-gap-between-content-small)}#b_results .tab-menu li:hover{box-shadow:none}#b_content
#b_results .b_wikiRichcard .tab-active:focus-visible{outline:0}#b_results .b_wikiRichcard
.tab-menu,#b_results .b_wikiRichcard .tab-menu li,#b_results .b_wikiRichcard .tab-menu
ul{height:auto;line-height:var(--AC_LineHeight)}#b_results .b_wikiRichcard
.tab-head{display:flex;justify-content:center;align-items:center}#b_results .b_wikiRichcard
.tab-head:has(tab-navr){width:fit-content}#b_results .b_wikiRichcard .tab-head
li{padding-top:var(--smtc-gap-between-content-x-small);padding-bottom:var(--smtc-gap-between-content-x-small)}#b_results .b_wikiRichcard .tab-container{padding-bottom:0}.b_wikiRichcard_noHeroSection
span{color:var(--bing-smtc-foreground-content-neutral-secondary-alt)}#b_results .b_wikiRichcard,#b_results
.b_wikiRichcard span{font:var(--bing-smtc-text-global-body3)}#b_content #b_results .b_algo
.b_wikiRichcard .tab-head .tab-menu li
.tab-active{color:var(--smtc-foreground-content-neutral-primary)}#b_content #b_results .b_algo
.b_wikiRichcard .tab-head .tab-menu
li:not(.tab-active){color:var(--bing-smtc-foreground-content-neutral-tertiary)}#b_content #b_results .b_algo
.b_wikiRichcard:not(:has(.tab-navr)) .tab-head .tab-menu
li:not(.tab-active):hover{color:var(--bing-smtc-foreground-content-brand-rest)}.b_wikiRichcard
.b_vList>li{padding-bottom:var(--smtc-gap-between-content-xx-small)}#b_results>li .b_wikiRichcard
a{color:var(--smtc-ctrl-link-foreground-brand-rest)}.mc_fh{height:100%;border-radius:6px}.mc_tc_bs{overflow:hidden}.pvc_title_with_frows{padding-bottom:10px}.paratitle
.actionmenu{float:right;margin-top:-26px}.paratitle .actionmenu::after{float:none}.b_paractl,#b_results
.b_paractl{line-height:1.5em;padding-bottom:10px}#tabcontrol_18_73F2D7 .tab-head { height: 40px; }
#tabcontrol_18_73F2D7 .tab-menu { height: 40px; } #tabcontrol_18_73F2D7_menu { height: 40px; }
#tabcontrol_18_73F2D7_menu>li { background-color: #ffffff; margin-right: 0px; height: 40px;
line-height:40px; font-weight: 700; color: #767676; } #tabcontrol_18_73F2D7_menu>li:hover { color: #111;
position:relative; } #tabcontrol_18_73F2D7_menu .tab-active { box-shadow: inset 0 -3px 0 0 #111;
background-color: #ffffff; line-height: 40px; color: #111; } #tabcontrol_18_73F2D7_menu .tab-active:hover {
color: #111; } #tabcontrol_18_73F2D7_navr, #tabcontrol_18_73F2D7_navl { height: 40px; width: 32px;
background-color: #ffffff; } #tabcontrol_18_73F2D7_navr .sv_ch, #tabcontrol_18_73F2D7_navl .sv_ch { fill:
#444; } #tabcontrol_18_73F2D7_navr:hover .sv_ch, #tabcontrol_18_73F2D7_navl:hover .sv_ch { fill: #111; }
#tabcontrol_18_73F2D7_navr.tab-disable .sv_ch, #tabcontrol_18_73F2D7_navl.tab-disable .sv_ch { fill:
#444; opacity:.2; }Wikipedia
```

Web: <https://www.aitesigns.co.za>

