

# Tungsten content in solar photovoltaic panels

Is tungsten disulfide a photovoltaic material?

Very recently, tungsten disulfide ( $WS_2$ ) has become the focus of thin-film solar cell materials due to its opto-electrical properties. Although the individual crystals of this material have been studied in optical devices, only a few studies have been carried out concerning the photovoltaic properties of a thin film.

What is a tungsten based absorber?

In the proposed tungsten based absorber for visible regime, the structure contains a ground plane made up of a metal underneath a dielectric layer which in turn is below a resonating structure made up of a same metal as ground plane (metal-dielectric-metal) as shown in Fig. 1. The dielectric layer is made up of silicon dioxide ( $SiO_2$ ).

Why is tungsten used in nanostructure layer?

Major motivation behind the research is introduction of tungsten (W) for nanostructure layer which has higher melting point than any other metal i.e. Gold (Au), Silver (Ag), Chromium (Cr), Copper (Cu) and even Titanium Nitride (TiN) which is a refractory material.

Can  $WS_2$  be used as a photovoltaic material?

The optical bandgap of as-deposited  $WS_2$  thin films ranged from 1.7 eV to 2.2 eV. The results were well matched with the findings of a previous study 44. These obtained results were highly desirable for photovoltaic materials and give strong recommendations to use  $WS_2$  as a photovoltaic material.

What makes a good photovoltaic material?

Photovoltaic materials should be inexpensive and abundant. They should have good carrier concentration properties for both minority and majority carriers, low carrier recombination loss in grain boundaries, and adhesive to the surface 47.

Are tungsten-metasurface absorbers suitable for a wide frequency spectrum?

In this paper, novel absorbers using tungsten-metasurface are developed which give ultrahigh absorbance over a wide frequency spectrum. The proposed designs are two-dimensional, polarization insensitive, broadband and are predicted to give better response under high temperatures ascribed to high melting point of tungsten i.e. 3422 °C.

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