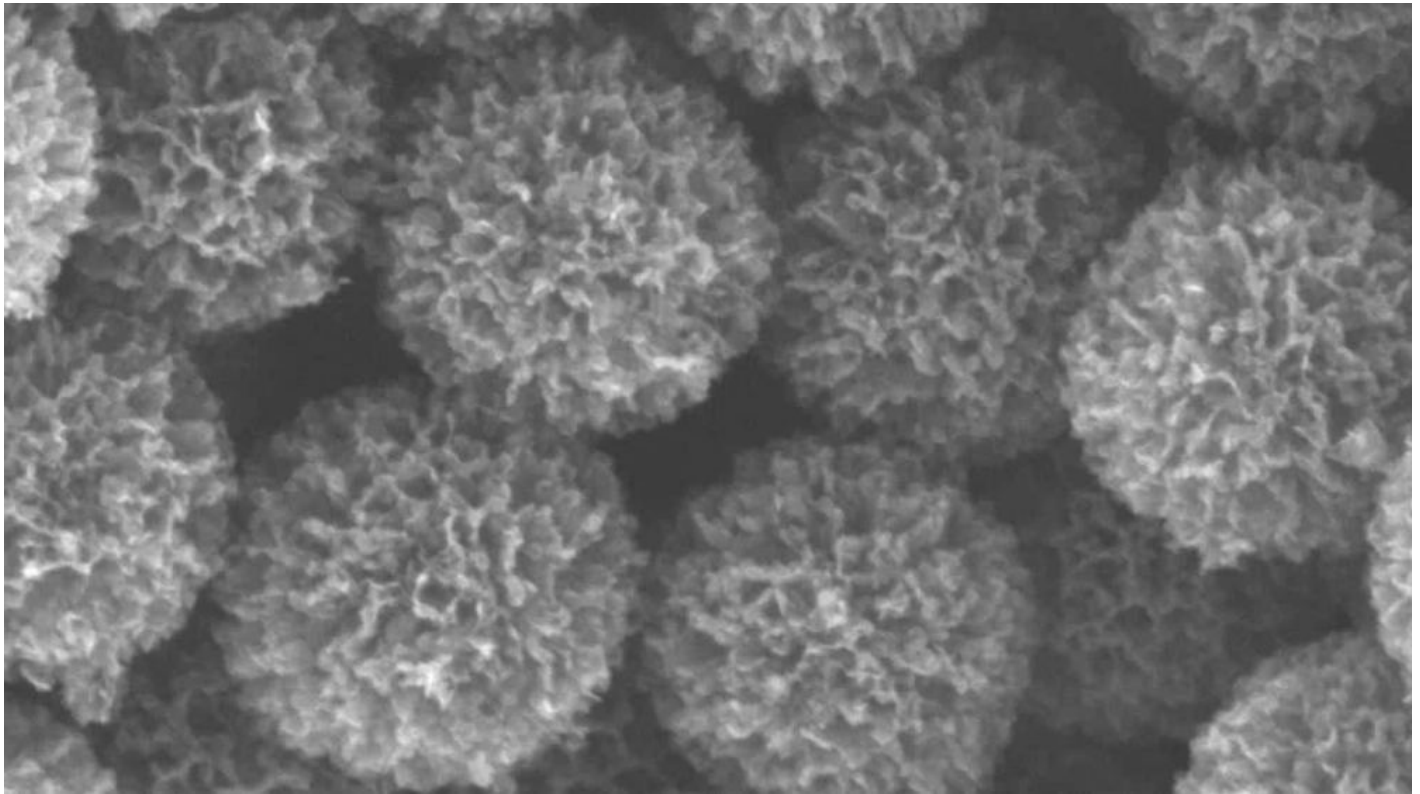


Carbon nanoflorets

October 31, 2023 • vajiramandravi.com



About Carbon nanoflorets

- These are like tiny marigold flowers made only of carbon which are called as the material carbon nanoflorets.
- Process of synthesis
 - Researchers heated a special form of silicon dust called DFNS (for dendritic fibrous nanosilica) in a furnace.
 - Once heated, she introduced acetylene gas into the chamber.
 - The white powder turned black – a sign that carbon had been deposited on the DFNS.
 - Then they collected the black powder and treated it with a strong chemical that dissolved the DFNS away, leaving carbon particles behind.
- The structure of the silicon particles – 50-1,200 nanometers in size – resembled spikes arranged around a sphere.
- Observation
 - They reported that these nanoflorets could absorb sunlight at many frequencies and convert it to heat with an unprecedented efficiency.
 - The nanoflorets also didn't easily dissipate the heat generated into the environment, making the material a good candidate to heat.

- The nanoflorets converted the light energy they absorbed into thermal energy – a process called solar-thermal conversion – with a remarkable efficiency of 87%.
 - The carbon nanoflorets' high efficiency comes from three properties.
 - The nanoflorets absorb three frequencies in sunlight – infrared, visible light, and ultraviolet while other common materials absorb only visible and ultraviolet light.
 - Shape: As light falls on the material, the carbon cones ensure that very little is reflected back.
 - Long-range disorder: Parts of the structure at some distance from each other possess different physical properties. As a result, heat waves in the material aren't carried over long distances, reducing the amount of heat dissipated away.
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Q1) What is Infrared (IR) radiation?

It is a part of the electromagnetic spectrum that lies between visible light and microwaves. It has wavelengths longer than those of visible light, ranging from approximately 0.7 micrometers (microns) to 1 millimeter. Infrared radiation is invisible to the human eye but can be detected and utilized in various scientific, industrial, and technological applications.

Source: Tiny carbon 'flowers' turn light to heat at unrivalled efficiency, IIT team finds

Source: <https://vajiramandravi.com/current-affairs/carbon-nanoflorets/>

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