Single-Crystalline Scandium Nitride

Why in News?

Researchers at Bengaluru's **Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)** have discovered a **new material** called **"single-crystalline scandium nitride (ScN)"** that can **convert infrared light into** renewable energy.

- To accomplish this feat, **scientists used a scientific phenomenon known as polariton excitations,** which occur in tailored materials when light couples with either collective free electron oscillations or polar lattice vibrations.
- Infrared light is **beyond the light range that is visible to the human eye, and falls between the visible light and microwave regions** (the wavelength is longer than visible light).
    - Infrared sources, emitters, and sensors are in **high demand across a wide range of industries, including electronics, healthcare, defense and security, and energy,** further infrared polaritons in scandium nitride will enable its use in a variety of such devices.

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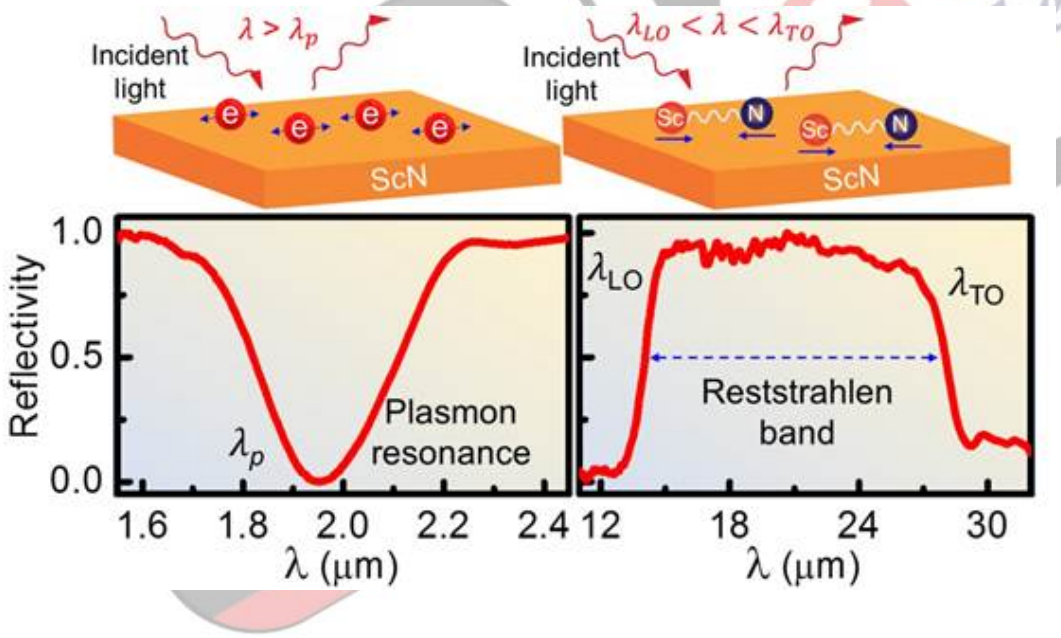

What are the Key Highlights of Single-Crystalline Scandium Nitride (ScN)?

- **About:**
    - It has high **efficiency in emitting, detecting, and modulating infrared light, making it useful for solar and thermal energy harvesting, as well as optical communication devices.**
    - Scientists have carefully controlled material properties to **excite polaritons** (a quasi-particle) and **achieve strong light-matter interactions in single-crystalline scandium nitride (ScN) using infrared light.**
- **Significance:**

- As these polaritons in ScN are also **compatible with modern complementary-metal-oxide-semiconductor (CMOS) or Si-chip technology** and, as such, could be easily integrated into on-chip optical communication devices.
- These exotic polaritons in the ScN can be utilized for solar and thermal energy harvesting.

Source: PIB

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