Perovskite LEDs (PeLEDs)

Source: PIB

India's researchers developed a method to reduce **anion migration** in **perovskite nanocrystals** that can enable **next-gen lighting** and improve **energy efficiency** as lighting consumes nearly **20% of global electricity**.

- Anion migration in perovskite nanocrystals causes **color instability** and **limits their use in lighting.**
- **Perovskite LEDs (PeLEDs),** made from perovskite nanocrystals, **combine the advantages of Organic LEDs (OLEDs) & Quantum Dot LEDs (QLEDs)**, making them promising for **next-generation lighting.**
    - PeLEDs combine the best features of **OLEDs (flexibility, lightweight)** and **QLEDs (high color purity)** while offering **superior efficiency** and **cost-effectiveness**.

Evolution of Lighting Technologies:

- **Early Technology:** From **incandescent** and **fluorescent lamps to LEDs** (invented in the 1960s).
- **Breakthrough in 1993: Shuji Nakamura**'s team developed high-brightness **blue LEDs,** leading to energy-efficient **white LEDs** and winning the **2014 Nobel Prize in Physics.**
- **Current Technologies:**
    - **OLEDs: Thin, flexible**, but costly with **shorter lifespans**.
    - **QLEDs:** Precise **color control**, durable, but **toxic** with resource scarcity concerns.
    - **Micro/Mini-LEDs: High brightness and stability** but expensive to produce.

Read More: Light Emitting Diodes (LED)