

# Lowering the cost and environmental footprint of white LEDs

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Replacing traditional light bulbs with light-emitting diodes (LEDs) could take a significant bite out of global energy consumption. But making white LEDs isn't completely benign or budget friendly. To help reduce the environmental footprint and cost of these lights, researchers have developed the first white LED with a hybrid, metal-organic framework material. Their report appears in the journal *ACS Nano*.

Widespread use of low-power, long-lasting LEDs in the U.S. could save nearly 348 terawatt-hours by 2027, which equals the annual output of 44 power plants, according to the U.S. Department of Energy. But white LEDs are currently made with rare-earth elements, and mining these minerals can be costly and produce toxic waste. Additionally, existing commercial methods for producing white LEDs involve multiple components and steps that reduce efficiency and quality.

So, Kuang-Lieh Lu, Yang-Fang Chen and colleagues developed more cost-effective and environmentally friendly white LEDs using graphene and a strontium-based, [metal-organic framework](#) (MOF) that does not include rare-earth elements. MOFs comprise a promising new class of hybrid materials made of metallic ions and organic ligands. Testing showed that the devices' emission spectrum was close to that of natural sunlight.

**More information:** Electrically Driven White Light Emission from Intrinsic Metal-Organic Framework, *ACS Nano*, [pubs.acs.org/doi/abs/10.1021/acsnano.6b03030](https://pubs.acs.org/doi/abs/10.1021/acsnano.6b03030).

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