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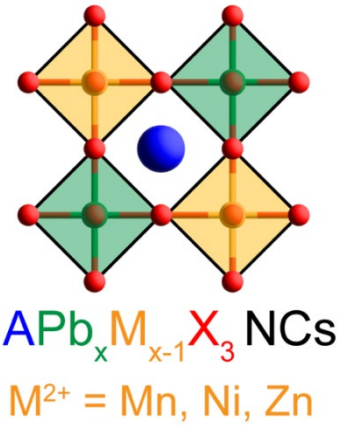
Licensing Opportunity

TTO – Technology Transfer Office

New light-emitting semiconductor quantum dots



Halide perovskite nanocrystals (NCs) take the form ABX_3, where a is a small cation, B is a divalent metal, and X is a halide anion. The common B-site cation, Pb, can be doped with small amounts of transition metal dopants, resulting in the improvement of optoelectronic properties, and the endowment of new properties.

Ref. Nr

6.2595

Keywords

Halide perovskite, nanocrystal, quantum dot, doping

Intellectual Property

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Publications

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Description

In recent years, halide perovskite materials have gained substantial attention due to their promising optoelectronic properties, which position them as key candidates for applications such as solar cells, LEDs, photodetectors, and emerging quantum technologies. Nevertheless, existing perovskite-based technologies face several challenges, such as instability and difficulties in producing uniform, nanoscale crystalline structures. This new method for preparing halide perovskite nanocrystals and its new composition described here overcome these limitations by introducing doped crystalline particles with controlled edge length distribution and incorporating alternative cations and metal dopants.

Advantages

The new synthetic method results in halide perovskite nanocrystals with precise control of size and metal dopant concentration, resulting in previously unreachable size regimes for doped halide perovskite nanocrystals.

Applications

- Optoelectronics: The tunable optical properties are ideal for use in LEDs, photodetectors, and laser technologies, especially in the deep blue spectral region, as the bandgap can be modulated by size and composition.
- Sensors: The enhanced stability and customizable properties of materials make them suitable for chemical and environmental sensors
- Nanoscale magnets: Doping paramagnetic and ferromagnetic metals into the halide perovskite nanocrystal could result in nanoscale magnets also with interesting optoelectronic properties.
- Quantum technologies/Spintronics: Size-controlled metal doping is crucial for spin-photonic interfaces relying on metal-doped halide perovskites.