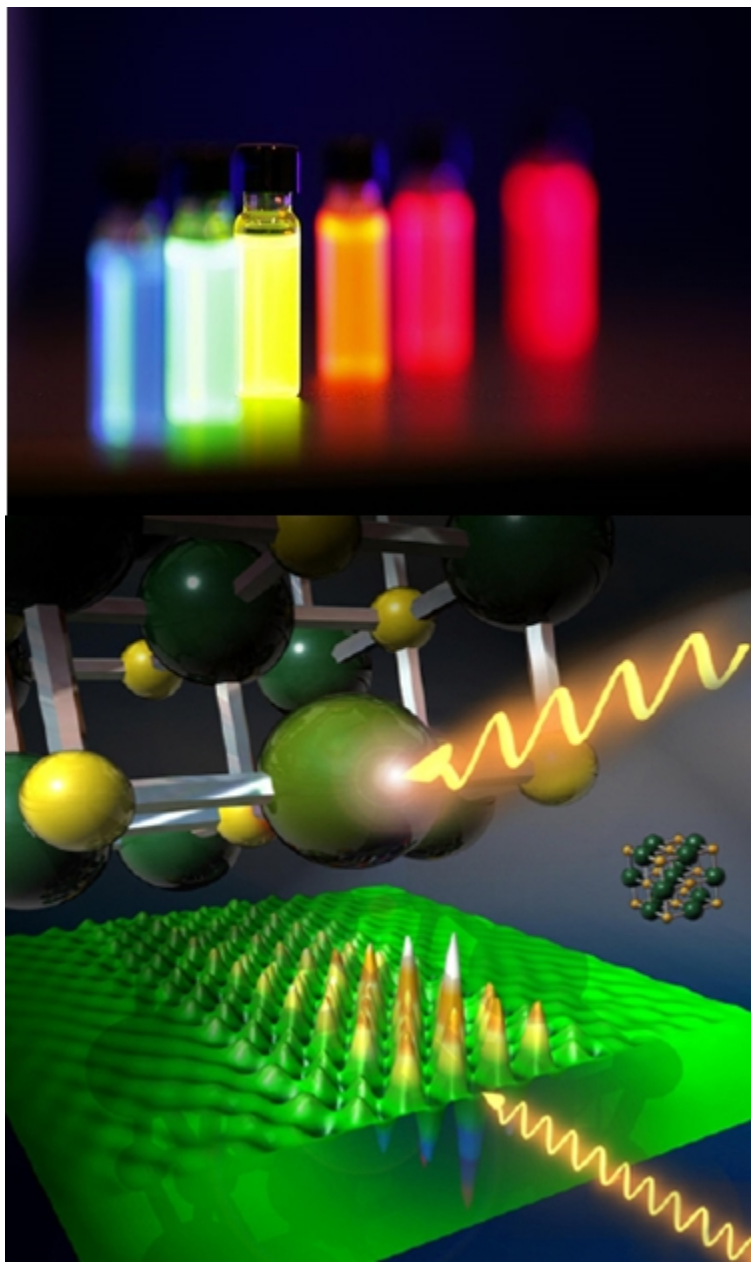
Hybrid Molecule Nanocrystal Photon Upconversion

Tech ID: 25111 / UC Case 2015-753-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,386,697	08/20/2019	2015-753

IMAGES



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BRIEF DESCRIPTION

Background:

Solar resources are at a premium and the solar energy industry is a $130B market with growth projects of 30%. High demands for attaining renewable energy efficiently and cost-effectively, along with government incentives, are all good indicators for finding innovative ways to optimize solar energy systems.

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OTHER INFORMATION

KEYWORDS

upconversion, semiconductor, solar cell, near-infrared, NIR, photon, energy, solar energy, nanocrystals, energy systems, solar industry

CATEGORIZED AS

- **Energy**
  - Solar
- **Materials & Chemicals**
  - Nanomaterials
- **Nanotechnology**
  - Materials
- **Semiconductors**
  - Materials

RELATED CASES

2015-753-0

Brief Description:

Traditional semiconducting materials, i.e. silicon and cadmium telluride are unable to absorb all wavelengths of light and become usable energy. UCR researchers were able to functionalize semiconducting nanocrystals that are very efficient in upconverting near infrared photons into higher energy photons. They have optimized upconversion through carefully formulated combinations of semiconductor nanocrystals and organic ligands to enhance upconversion emission by up to 3 orders of magnitude relative to nanocrystals alone. This provides a way to enhance the efficiency of photovoltaic cells and reduce solar electricity costs.

ADVANTAGES

- Cheap & scalable synthesis of semiconducting materials
- Upconversion of photons in visible and near-infrared spectral regions
- Maximize resource capabilities
- Reduce costs i.e. electricity

APPLICATIONS

- Solar chargers & panels
- Photodetectors
- Data storage
- Imaging

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