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# METHOD FOR DETECTION AND SEPARATION OF ENANTIOMERS USING VESICLE-LIKE NANOSTRUCTURES SELF-ASSEMBLED FROM JANUS NANOPARTICLES

Tech ID: 34340 / UC Case 2018-116-0

#### **BACKGROUND**

Something that is chiral cannot be superposed over its mirror image, no matter how it is shifted (ex. our hands). These two mirror images, called enantiomers, rotate plane-polarized light in opposite directions.

Chiral nanostructures have unique materials properties that can be used in many applications. In pharmaceutical research and development, chiral analysis is critical, as one enantiomer may be more effective than the other. Researchers at UC Santa Cruz have developed new ways of performing enantiomeric analyses using the plasmonic circular dichroism absorption qualities of nanostructures.

## **TECHNOLOGY DESCRIPTION**

The technology and methods are based on the observation that gold Janus nanoparticles, with hydrophobic hexanethiolates and hydrophilic 3-mercapto-1,2-propanediol ligands segregated on the two hemispheres of the metal cores, self-assembled into vesicle-like hollow nanostructures without needing any chiral templates or scaffolds.

The Janus nanoparticles themselves are achiral, but the hollow nanoparticle ensembles they self-assemble into show plasmonic circular dichroism absorption. Experiments with alanine showed that the Janus nanoparticle ensembles showed high enantioselectivity towards D-alanine, rather than L-alanine, as shown by circular dichroism measurements. The high enantioselectivity property may be used in diverse applications.

# **APPLICATIONS**

- ► enantiomeric analysis
- sensing
- catalysis
- optoelectronic devices
- pharmaceutical research and analysis

# ADVANTAGES

lack eliminates need for chiral templates or scaffolds

# INTELLECTUAL PROPERTY INFORMATION

Country	Туре	Number	Dated	Case
United States Of America	Issued Patent	12,392,772	08/19/2025	2018-116
Patent Cooperation Treaty	Published Application	2019/164734	08/29/2019	2018-116

# RELATED MATERIALS

Plasmonic circular dichroism of vesicle-like nanostructures by the template-less self-assembly of achiral Janus nanoparticles - 07/03/2018

# ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Rapid Preparation of Electrocatalysts by Magnetic Induction Heating and Rapid Quenching
- ▶ Platinum Oxide Nanoparticles For Electrocheical Hydrogen Evolution Influence Of Platinum Valence State

Permalink

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## **INVENTORS**

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## OTHER INFORMATION

#### **KEYWORDS**

Janus, nanoparticle, dichroism,

chiral, enantiomer, plasmonic

circular dichroism

# CATEGORIZED AS

- **▶** Optics and Photonics
  - ► All Optics and Photonics
- ► Materials & Chemicals
  - Chemicals
  - Nanomaterials
- Nanotechnology
  - Materials
  - ▶ NanoBio
- ► Research Tools
  - Reagents

RELATED CASES

2018-116-0

- Ru,N-Codoped Carbon Outperforms Platinum Toward Hydrogen Evolution Reaction In Alkaline Media By Atomically Dispersed Ruthenium
- ▶ Catalysis Of The Hydrogen Evolution Reaction Using Ruthenium Ion Complexed Carbon Nitride Materials

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