PURDUE INNOVATES | Office of Technology Commercialization

Flexible Amine Based Selenium Dissolution Free From Contaminants

A flexible, cost-effective, and contamination-free method for creating pure selenium solutions under a highly reducing atmosphere supports advanced manufacturing for electronics and solar cell applications.

Selenide nanoparticles are important materials with applications in electronics, solar cells, light emitting diodes (LEDs), and biology. Making selenide particles first starts with the dissolution of elemental selenium with a reaction solvent. Current methods for making dissolved selenium, such as using organo-phosphine compounds or sodium borohydrine, are costly, unstable, and lead to contaminated, impure selenium solutions.

Researchers at Purdue University have developed a new method to control the dissolution of elemental selenium into a pure selenium solution. This method involves making a highly reducing atmosphere, which then solvates the selenium. The resulting reaction can be controlled and tuned to produce a range of desired solutions. This also provides opportunities to conduct additional chemical reactions with a pure selenium solution and create mixed chalcogen materials.

Advantages:

-Free of contaminants and impurities

-Flexible and controllable

-More stable and less costly

Potential Applications:

-Electronics

-Solar cells

-LEDs

TRL: 3

Technology ID
2014-AGRA-66627

Category
Semiconductors/Semiconductor Materials & Substrates
Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Authors
Rakesh Agrawal
Bryce Walker

Further information
Will Buchanan
wdbuchanan@prf.org

View online

Intellectual Property:

Provisional-Patent, 2013-11-21, United States | Utility Patent, 2014-11-21, United States

Keywords: Selenide nanoparticles, electronics applications, solar cells, LEDs, dissolved selenium, pure selenium solution, highly reducing atmosphere, solvated selenium, controlled reaction, mixed chalcogen materials, Chemical Engineering, LEDs, Materials and Manufacturing, Nanoparticles, Semiconductors, Solar