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# Functionalized Sila-Adamantane

Tech ID: 32903 / UC Case 2022-883-0

#### **PATENT STATUS**

Country	Туре	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2023/177686	09/21/2023	2022-883

Additional Patent Pending

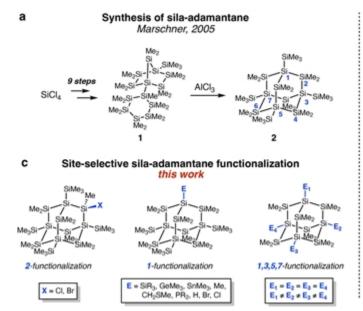
#### **FULL DESCRIPTION**

#### Background:

The carbon based adamantane has enabled a myriad of valuable applications in medicine, imaging probes, catalysts, etc. because chemists have been able to install site selective functional groups. The silicon version of adamantane, sila-adamantane shares similar fundamental properties that make it useful. Despite its promise, the development of silicon diamondoids has remained in its infancy because of the difficulty in its synthesis.

## Technology:

Prof. Timothy Su and his research team have developed a novel, patent pending method for the gram-scale synthesis and its regioselective functionalization at five discrete silicon centers within its core. These syntheses are guided by mechanistic insights that implicate an aluminate-stabilized silylium ion at the 2-position as the final intermediate in the isomerization synthesis.



CONTACT

Venkata S. Krishnamurty venkata.krishnamurty@ucr.edu tel: .

#### OTHER INFORMATION

**KEYWORDS** 

Silanes, Oligosilanes, Sila-

Adamantane, Sila-diamondoids, Nano

Electronics, Diamondoids, Silicon

nanocrystals, Catalysts

#### **CATEGORIZED AS**

- **▶** Optics and Photonics
  - ► All Optics and Photonics
- **▶** Computer
  - ▶ Hardware
- **▶** Energy
  - Storage/Battery
- **▶** Medical
  - ► New Chemical Entities,

Drug Leads

- Nanotechnology
  - Materials
- Semiconductors
  - Materials

**RELATED CASES** 

2022-883-0

Synthetic strategies for functionalizing sila-adamantane at five discrete locations within the cluster core, paving the way for functional silicon diamondoid materials.

## **ADVANTAGES**

The significant aspects of this invention are:

Significantly more efficient as evidenced by the ability to access sila-adamantane on gram scales and in higher purity compared to prior art.

No chlorinated by-products.
Provides for derivatizing the sila-adamantane cluster in site selective fashion with either the same or unique functional groups.
Atomically precise structure of sila-adamantane is an advantage over existing silicon nanocrystals that are heterogeneous in core size and
surface chemistry.

### **SUGGESTED USES**

Applications that could be enabled by this invention include:

Use as a ligand for improved chemical catalysis

Nanoscale silicon electronics

Battery anode materials

Pharmacology and medicine

UV/blue-emitting materials

Atomically precise versions of silicon donor qubits

## STATE OF DEVELOPMENT

Experimental, lab-level demonstration of the process. 20 derivatives of sila-adamantane have been successfully synthesized and are ready for testing.

## **RELATED MATERIALS**

▶ Site-Selective Functionalization of Sila-Adamantane and Its Ensuing Optical Effects

University of California, Riverside

Office of Technology Commercialization

200 University Office Building,

Riverside, CA 92521

otc@ucr.edu

research.ucr.edu/

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