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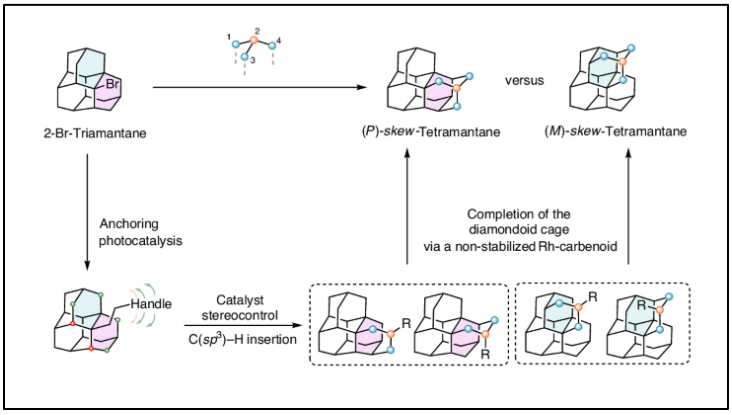
Technology Opportunity, Ref. No. UA-26/132

Selective Synthesis of (Higher) Diamondoids

A novel synthetic strategy enables controlled access to isomerically pure diamondoids and functionalized derivatives. The technology overcomes the barriers for the synthesis of higher diamondoids and unlocks the potential for industrial applications in materials science, electronics, catalysis, quantum sciences, diamond synthesis, pharmaceuticals and life sciences.



Keywords Diamondoids, Tetramantane, Hydrocarbons, Synthetic Diamond

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Background Diamondoids are molecular fragments of diamond, combining exceptional stability with well-defined molecular structure. In particular higher diamondoids, e.g. tetramantanes, are attractive but remained synthetically inaccessible. For example, *skew*-tetramantane, a highly stable σ-helicene, has so far only been available in trace amounts from raw petroleum and deep natural gas condensates via laborious methods, but is now selectively obtained by synthesis for further exploitation.

Invention By means of an "adamantalogous cage extension", the invention provides modularity for isomerically pure diamondoids. The approach relies on controlled catalysis, selective C(sp^3)–H functionalization and ring-expansion strategies. Importantly, the method also grants access to functionalized tetramantane intermediates, enabling further derivatization and the integration into advanced molecular architectures

Fields of Use Pharmaceutical and life science research, functional carbon-based materials, nano-technology, diamond synthesis, quantum science and surface modifications.

Patent Status Patent application filed (EP/25185320.6)

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