Title of the talk:

Silicon Fullerenes: Results and expectations

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ABSTRACT

The theoretical and experimental attempts towards silicon based hollow spherical cages; the "Silicon Fullerenes", similar to the well known carbon Fullerenes, are described, critically reviewed and analyzed. The direct silicon analogs of C_{60} (such as Si_{60}) and other Fullerenes, are unstable and distorted due to the inherent differences between sp^3 (in silicon) and sp^2 or sp (in carbon) bonding. Contrary to carbon Fullerenes, the Fullerene-like silicon cages are in reality sp^3 bonded. Comparisons with carbon Fullerenes and silicon nanoparticles, as well as evaluation of the suggested possible methods of preparation are critically discussed. It is illustrated that among various experimental techniques and theoretical models, ranging from transition metal encapsulation to stuffing, and/or coating with various molecular agents, the exohedral (or combined exohedral and endohedral) hydrogenation is by far the most successful and promising technique.

Keywords: Silicon Fullerenes, Silicon nanoparticles, Fullerenes, Silicon cages, Silicon nanostructures, σ and π bonding, sp^3 and sp^2 bonding