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Biomedical Application of Fullerenes

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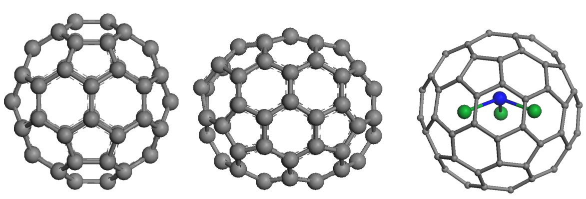
Fullerenes and endohedral fullerenes have attracted considerable attention in the science field since their discovery in 1985. Especially, the novel physicochemical properties along with the exotic nanostructures make them an appealing subject in medicinal chemistry. The smart modification on the unique carbon cage further endows them abundant functionality. For example, in fullerene family, nano prince C_{60}, can be exploited in various medical fields due to the appealing photo, electrochemical and physical properties, such as HIV protease inhibitor, radical scavenger and antioxidant, photosensitizer [1], gene and drug deliver carrier, and so on. Once other functional atoms or clusters are encapsulated inside the carbon cage, the resulting endohedral fullerenes will exhibit the unique properties of both endoclusters and carbon cage. For example, paramagnetic gadolinium encapsulated endofullerenes can work as high efficient magnetic resonance imaging contrast agent with low toxicity [2,3], radiolabelled ^{166}Ho encapsulated endofullerenes can work as radiotracer. Herein, fullerene and endohedral fullerenes will be reviewed for their application in biomedicine as well as our recent progress.



a b c

Schematic structures of C_{60} (a), C_{70} (b) and $Gd_3N@C_{80}$ (c).

References:

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