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Energy efficiency and building environment

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With the environmental protection posing as the number one global problem, man has no choice but reducing his energy consumption, one way to accomplish this is to resort to passive and low-energy systems to maintain thermal comfort in buildings. The conventional and modern designs of wind towers can successfully be used in the hot arid regions to maintain thermal comfort (with or without the use of ceiling fans) during all hours of the cooling season, or a fraction of it. Climatic design is one of the best approaches to reduce the energy cost in buildings. Proper design is the first step of defence against stress of climate. Buildings should be designed according to climate of the site for reducing the need of mechanical heating or cooling hence maximum natural energy can be used for creating pleasant environment inside the built envelope. Technology and industry progress of the last decade diffused electronic and informatics' devices in many human activities and now appear also in building construction. The utilisation and operating opportunities components, increase the reduction of heat losses by varying the thermal insulation, optimise the lighting distribution with louver screens and operate mechanical ventilation for coolness in indoor spaces. In addition to these parameters the intelligent envelope can act for security control and became an important part of the building demotic revolution. Application of simple passive cooling measure is effective in reducing the cooling load of buildings in hot and humid climates. 43% reductions can be achieved using a combination of well-established technologies such as glazing, shading, insulation, and natural ventilation. More advanced passive cooling techniques such as roof pond, dynamic insulation, and evaporative water jacket need to be considered more closely. The building sector is a major consumer of both energy and materials worldwide, and the consumption is increasing. Most industrialised countries are in addition becoming more and more dependent on external supplies of conventional energy carriers, i.e., fossil fuels. Energy for heating and cooling can be replaced by new renewable energy sources. New renewable energy sources, however, are usually not economically feasible compared with the traditional carriers. In order to achieve the major changes needed to alleviate the environmental impacts of the building sector, it is necessary to change and develop both the processes in the industry itself, and to build a favourable framework to overcome the present economic, regulatory and institutional barriers.

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Transformation of the physical properties of Carboxylated-Nanodiamonds in water solution exposed to gamma irradiation.

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Nanodiamonds (NDs) have unique optical, thermal and mechanic properties. They also have the advantage of high biocompatibility, which makes them appropriate to biomedical applications. Recently a protective effect against γ-irradiation of carboxylated nanodiamonds (cNDs) has been reported on erythrocytes. The structural, mechanical thermal and optical properties transformation of cNDs dispersed in water and exposed to γ-radiation were analyzed. Commercial detonation NDs and cNDs were analyzed by different techniques including transmission electron microscopy (TEM), scanning electron microscope (SEM), X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and atomic force microscopy (AFM) after and before treatments with 20, 40, 60, 120 and 240 Gy of γ-irradiation. Here we report the water interaction with cNDs during radyolisis at different degree.

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