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Editorial

TiO_2-Based Materials for Heterogeneous Photocatalytic Applications

From the data of the Worldwatch Institute, a foundation annualy publish a report "The Condition of Earth". Each year the country members of the European Economic Community, produce about 2200 millions metric tons of residues (close to 18 Kg. by person, daily). From this quantity, 150 millions metric tons are listed as industrial residues. In addition, from these between 20 and 30 millions metric tons are residues catalogued as toxics and dangerous. According to the data of the Environment Protection Agency (EPA), in the United States of America, the quantity of toxics and dangerous remainders has increased upto 275 millions metric tons each year. These residues cause a great problem because most of them are directly casting out to public river beds through industry residual waters, with the concomitant contamination of such waters. Other part of the residues goes to weirs, which, is the storage problem. Different methodologies have been employed for the treatment of polluted water and air, such as biodegradation, chloration, ozone with UV-activation, and several combinations of these with activated carbon and other kinds of adsorbents and filters. However, in addition to some operative problems, all these methodologies have very important limitations, principally the type of pollutant and its concentration in the water or gaseous phases, and therefore, all them separately show relatively moderate efficiency. Therefore, it is very important to develop appopriate systems for the control and depuration of the great diversity of compounds in polluted waters and air. This problem has been satisfactory resolved by one of the most remarkable applications of the materials sciences, Heterogeneous Photocatalysis, particularly by using photoactive semiconductors as TiO_2 because it has been shown, up to now, the best photoactivity under UV-irradiation in the photodegradation reactions of organic pollutants, mainly aromatics molecules with cancerous a and mutagenic characteristics. This is the main objective of this special issue, to show some approaches of TiO_2-based materials in heterogeneous photocatalytic applications regarding water and air pollution.

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