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## Solar pebble bed reactor for treatment of textile and petrochemical industrial wastewater

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**Abstract :** Industrial wastewater poses a hazard to our nature, mostly to the water bodies, due to the presence of various complex chemicals in it. Petrochemical wastewaters are most problematic because they contain phenols, sulphides, oil, grease and other organic components which are said to be recalcitrant i.e. they continuously cause problems to the natural sources which need to be treated in order to reuse the water. Textile industrial wastewaters are rich in colour, containing residues of reactive dyes and chemicals, high COD and TOC concentration as well as hard-degradation materials. Hence we have attempted to degrade the organic matter of the effluent using solar energy. Solar detoxification process was carried out by using a solar pebble bed reactor. Silica pebbles were coated with a  $\text{TiO}_2$  suspension and used as a catalyst bed. Effluents were treated using solar radiation along with hourly analysis of COD and TOC for peak radiation level. Final TOC and COD values were obtained along with the values from the hourly analysis. These final readings were then compared with the initial concentrations. A significant reduction of about 60% to 70% was achieved in the TOC and COD values. Solar energy will help in less primary energy usage. There is significant reduction in the COD and TOC level.

**Keywords :** Silica Pebbles; Solar reactor; Textile effluent; Petrochemical effluent; Total Organic Carbon; Chemical Oxygen demand.

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