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Studies on photocatalytic behavior under UV and sunlight using nano-TiO_2

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TiO_2 semiconductor designates as a promising oxide material from both fundamental as well as from their potential applications in various devices [1-3]. Nowadays main issues of the universe are conservation of energy and pollution control. In this contest, various sizes and shapes of TiO_2 can be suitable oxide materials which have been synthesized by chemical technique where nanoparticles can be ensured. In this work, we have synthesized TiO_2 nanoparticles through one of the chemical route like sol-gel and post calcined at 500°C. Sample characterized by X-ray diffraction, Raman spectroscopy show pure anatase phase (Figure 1). Raman results also support the XRD results.

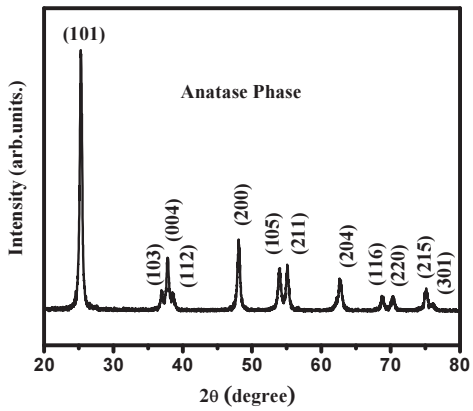

Figure 1: XRD pattern of TiO_2synthesized by sol gel route

Photocatalytic behavior of different organic dyes of concentration 5000ppm is studied by using 20mg of TiO_2 nanoparticles under UV-radiation as well as under sunlight.

While under UV-radiation, degradation of 100% of Methylene Blue (MB) takes 180 min, Congo Red (CR) takes 120 min and Rhodamine B (RhB) takes 180 min, under sunlight, MB takes 90 min, CR takes 45 min and RhB takes 180 min (Figure 2). From the results, it is concluded that the synthesized nano TiO_2 sample is more active under sunlight for MB and CR. By using sunlight which is a source of abundant energy, degradation of dyes, can be done easily rather than using UV-light. Thus TiO_2 is found to be an efficient catalyst for degradation of organic pollutant using sunlight.

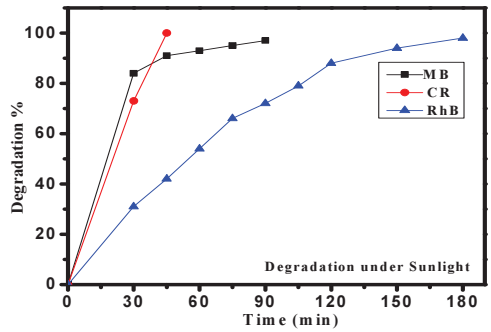

Figure 2: Effect of irradiation time on photo degradation under sunlight

References

1. C Rath et al., J phys. 42 (2009) 205101
2. P Mohanty et al., J Magn. Magn. Mat. 355 (2014) 240-24533
3. S Erdemoglu et al, J. Hazardous Materials 155 (2008) 469-476
4. W Zhou et al., J. Phys, D: Appl. Phys 43 (2010) 035301.
5. Z Jiao et al., Sci. Rep.3, 2720 (2013) srep02720