Poster

Grace titanium silicate-1 for treatment of Crystal violet and Methylene blue by wastewater

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The need for a more effective wastewater treatment is necessary to minimize dyes content in the wastewater and produce maximum amount of treated water that is suitable to be discharged into open water course. Photodegradation, is one of the used technologies due to its relatively simple design and cost effectiveness. Photodegradation involves the breakdown or decomposition of different organic contaminants, various dyes using UV or visible light solar spectrum. Metal oxides are considered promising candidate for photodegradation owing to their low cost, efficiency, simple fabricating method, sufficient availability, and environment friendliness for photocatalytic applications. The aim of our research is to develop materials for the treatment of dye effluents. In this case, we have chosen Grace Titanium Silicate 1 (GTS-1), deciding to replace part of the Titanium skeletal atoms with Zirconium, for the treatment of crystal violet (CV) and methylene blue (MB) wastewater. The widely used pseudo first and second order nonlinear kinetic models were employed to model the obtained photodegradation data for the different GTS-1-xZr (x = 0, 5, 10 and 15 wt% Zr). The kinetic studies showed that the removal of CV and MB was a rapid process, which obeyed the non-linear pseudo-second-order model, with a strong affinity towards the zeolite surface. Photodegradation using GTS-1-xZr is more efficient for MB than that for CV (Figure 1).

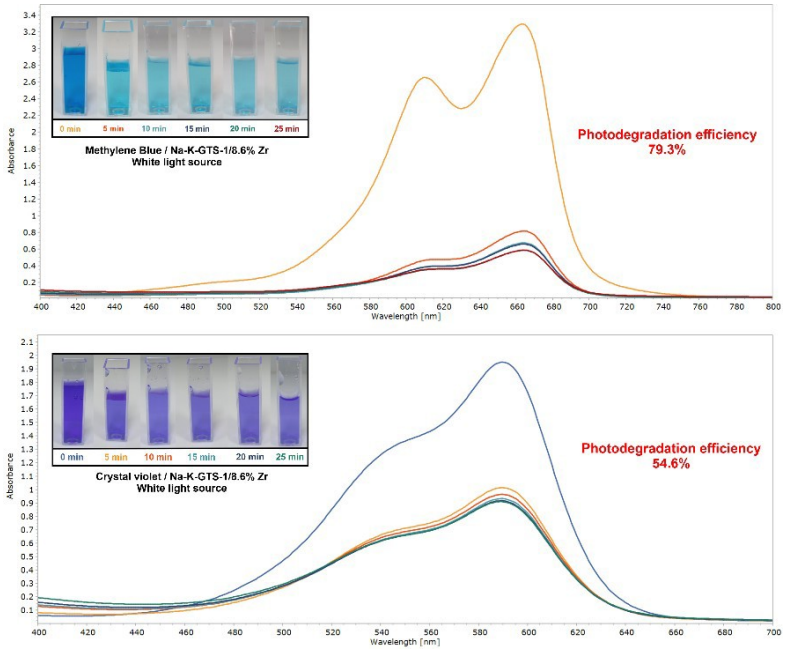

Figure 1. UV-Vis analysis of the photodegradation processes of methylene blue and crystal violet promoted by Na-K-GTS-1/8.6Zr and white light irradiation; the inset displays the colour change with the function of time.

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