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sa međunarodnim učešćem

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SADRŽAJ
CONTENT

Adsorption and photocatalytic degradation of methylene blue on carbon monolith with TiO_2 coating

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Recently, more attention has been paid to photocatalytic degradation as an effective method for removal of organic pollutants from the environment, especially from water. Titanium dioxide (TiO_2) has been proven to be a good photocatalyst due to good stability, high activity, little harmfulness to humans, easy availability and low cost [1,2]. Nowadays, different materials can be used as catalytic carrier for TiO_2 in the photocatalytic degradation process.

We have used cheap and simple methods for loading TiO_2 particles on carbon monolith (CM) carrier. Photocatalysts were prepared by impregnation of CM with TiO_2 using titanium solution. Additionaly, the CM composite photocatalysts were obtained by dip-coating method which implies the use of different binders [1].

CM is composite carbon material containing activated carbon on the inner capillary walls [3], which is good sorbent for methylene blue (MB) [4]. The amount of surface oxygen groups and specific surface area, obtained by temperature-programmed desorption and BET method, respectively, as well the adsorption test, showed that the high level of MB adsorption on CM elevates the photocatalytic activity of TiO_2 [2]. The presence of TiO_2 on CM carrier was determined by Raman spectroscopy and scanning electron microscopy (Fig. 1).

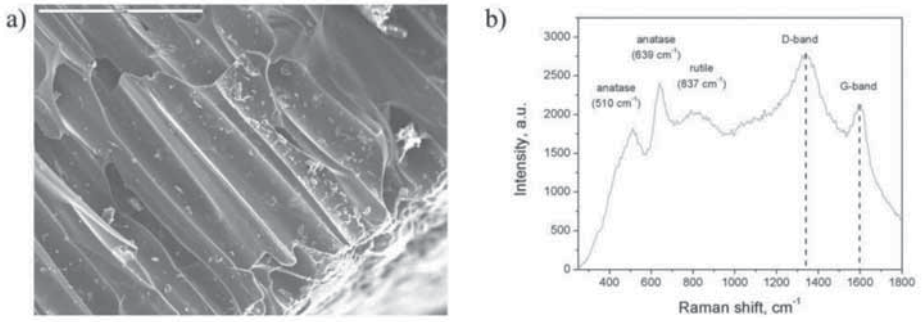

Figure 1. SEM photograph (a) and Raman spectrum (b) of carbon monolith loaded with TiO_2 particles

Photocatalytic degradation of MB on CM impregnated with TiO_2 was investigated in the presence UV irradiation. It was found that CM discs thickness and

the binder mass fraction in the composite photocatalysts affect the photocatalytic activity. The best photocatalytic activity of CM composite photocatalysts was achieved in the presence of a small mass fraction of binder and with increased CM disc thickness (Fig. 2).

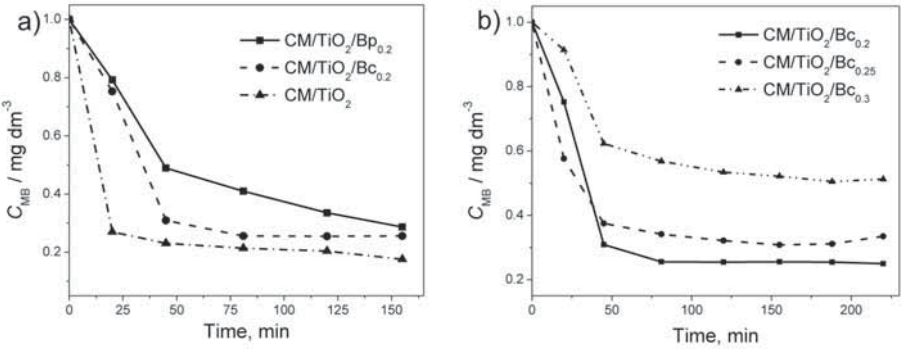

Figure 2. Degradation of methylene blue in the presence of TiO_2 with a) Teflon ($Bp_{0.2}$), Sodium carboxymethyl cellulose ($Bc_{0.2}$) and without binder; and b) different mass fraction of Bc

In order to investigate the influence of incident angle between UV rays and CM cross section on the photocatalytic activity, photocatalytic experiments were performed using different angles value: 90° and 82°. For the thinner sample (2mm), angle alternation has no major impact on photocatalytic activity. On the other hand, for the thicker CM disc (5mm), changes in the incident angle of UV rays leads to reflection from the walls of the CM capillary column. Consequently, the probability of collision between UV rays and TiO_2 particles increases, and therefore improve the photocatalytic activity of CM photocatalysts.

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References

1. Zhao, W., Bai, Z., Ren, A., Guo, B., Wu, C., *App. Surf. Sci.* 256 (2010) 3493-3498
2. Kim, C.H., Kim, B.H., Yang, K.S., *Carbon* 50 (2012) 2472-2481
3. Vukčević, M., Kalijadis, A., Babić, B., Laušević, Z., Laušević, M., *J. Serb. Chem. Soc.* 78 (0) (2013) 1, doi: 10.2298/JSC131227006V
4. Bestani, B., Benderdouche, N., Benstaali, B., Belhakem, M., Addou, A., *Bioresource Technol.* 99 (2008) 8441-8444

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