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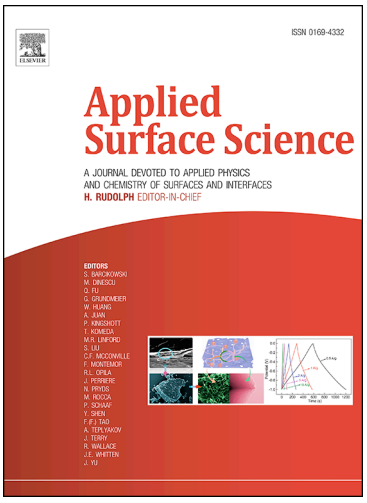

Full Length Article

Conjugated Conducting Polymers (PANI) Decorated $Bi_{12}O_{17}Cl_2$ Photocatalyst with Extended Light Response range and enhanced photoactivity

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Conjugated Conducting Polymers (PANI) Decorated $Bi_{12}O_{17}Cl_2$ Photocatalyst with Extended Light Response range and enhanced photoactivity

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Abstract: In this work, PANI/$Bi_{12}O_{17}Cl_2$ composites have been successfully synthesized via a simple and green strategy at room temperature. From TEM, EDS-mapping and DRS results, it can be seen that conducting polymers PANI loaded well on the $Bi_{12}O_{17}Cl_2$, and extended the light-absorption region of the composite to higher wavelength. The photocatalytic activity was evaluated by removal of CIP under visible light ($\lambda > 420$ nm). The degradation rate of the optimal ratio composite is about 2 times to that of $Bi_{12}O_{17}Cl_2$. The photodegradation intermediates of CIP were identified by mass spectrometry and the toxicity of the CIP photodegraded products was investigated via a microbiological antibacterial reaction. The results indicated the low-toxicity of the degraded products. Photocurrent results showed that the high separation and transfer of the photogenerated charge carriers were implemented by the introduction of PANI into the surface of $Bi_{12}O_{17}Cl_2$ material. Furthermore, long wavelength light ($\lambda > 550$ nm) degradation of CIP indicated that the PANI played as photosentizer could extend the light absorption region and thus enhance the photocatalytic ability. The reaction rate constant of optimal ratio PANI/$Bi_{12}O_{17}Cl_2$ composite was 3.1 times to $Bi_{12}O_{17}Cl_2$. Eventually, a possible photocatalysis mechanism was proposed.

Key Words: PANI; $Bi_{12}O_{17}Cl_2$; photocatalytic; toxicity; CIP;