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Carrier Separation and Charge Transport Characteristics of Reduced Graphene Oxide Supported Visible-Light Active Photocatalysts

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Supporting Information

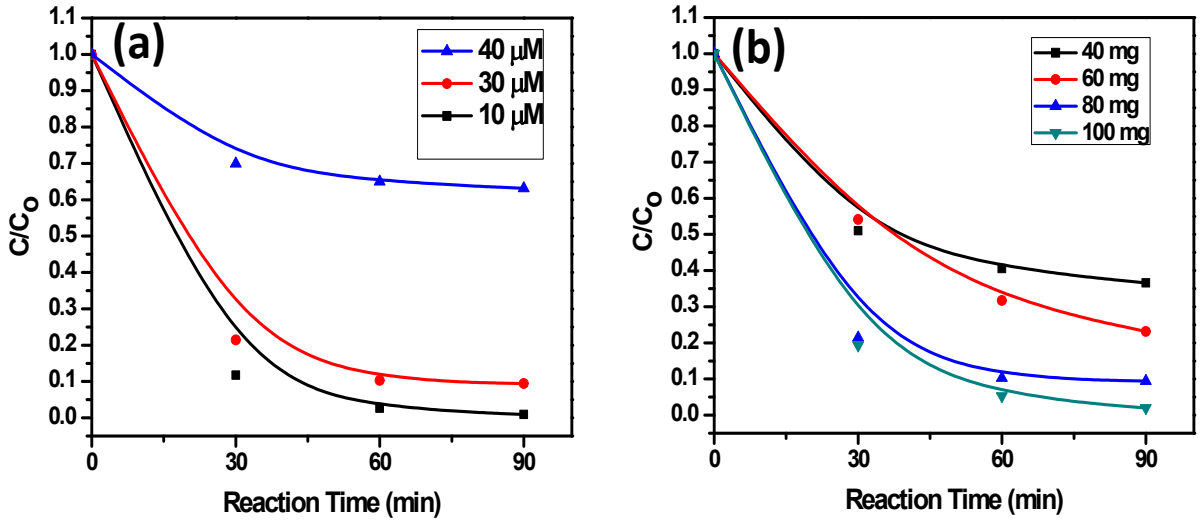

Fig. S1 (a) Effect of different initial concentration of MO under visible light irradiation and (b) different catalyst loading.

Initial concentration of MO in μM	% Photodegradation	Amount of MO degraded in μM
10	100	10.0
30	92	27.6
40	37	14.8

Table S1 Effect of initial concentration of MO dye on percentage degradation

The effect of concentration of MO was investigated by varying the initial concentration of MO from 10–40 μM and the AgI-mesoTiO_2-rGO (4 wt%) loading was kept constant. The normalized dye concentration against light irradiation time is shown in Fig. S1(a). For better understanding of effect of initial dye concentration in photodegradation, the results showed in Fig. S1 are also presented in Table. S1. It is clearly seen from Table 1 that the actual amount of MO degraded from 10, 30 and 40 μM are 10, 27.6 and 14.8 μM, respectively. This result shows that the initial concentration of dye plays a crucial role in photodegradation process. As evident from the present result that 92 % degradation of 30 μM is much higher compared to that of 100 and 37% of 10 and 40 μM. At the same time, further increasing the concentration of the dye more than 30 μM, i.e., 40 μM, the % photodegradation of MO is gradually decreased. A possible reason is that the increase in initial concentration of dye reduces the transmittance of the incident light thereby preventing the absorption of photons by the photocatalysts. A similar effect was noted by Matthews et al.[1] for the degradation of methylene blue dye. Thus, an increase in initial concentration of dye decreases the photocatalytic degradation.

The effect of catalyst dosage on photodegradation efficiency was also evaluated by varying the catalyst dosage from 40–100 mg/80 mL with 30 μM initial concentration of MO. As shown in Fig. S1(b), it can be seen that the degradation of MO linearly increases from 63 to 98% with increasing the amount of catalyst loading (40–100 mg). The enhancement in the

photodegradation is due to the increasing visible light absorbance by the photocatalysts, which results in the formation of more reactive radicals for the effective degradation of organic pollutants. In the present work, 80 mg / 80 mL (1mg / mL) was the optimized catalyst loading for the degradation of MO and the rest of the studies were carried out with 80 mg of catalysts.

References

1. R.W. Matthews, *J. Chem. Soc. Faraday Trans.*1989, **85**, 1291–1302.