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The modification of Ag_3VO_4 with graphene-like MoS_2 for the enhanced visible- light photocatalytic property and stability

Tingting Zhu[a], Liying Huang[a], Yanhua Song[b], Zhigang Chen[a], Haiyan Ji[a], Yeping Li[a], Yuanguo Xu[a], Qi Zhang[c], Hui Xu[a]*, Huaming Li[a]*

[a] School of Chemistry and Chemical Engineering, Institute for Energy Research, Jiangsu University, Zhenjiang 212013, P. R. China

[b] School of Environmental and Chemical, Engineering, Jiangsu University of Science and Technology, Zhenjiang 212003, P. R. China

[c] Hainan Provincial Key Lab of Fine Chemistry, Hainan University, Haikou, Hainan 570228, P.R. China

E-mail address: xh@ujs.edu.cn, lihm@ujs.edu.cn

Fig. S1a indicated the survey spectrum of the pure Ag_3VO_4, which showed the coexistence of V, Ag and O elements without any impurities. Fig. S1b showed the high-resolution spectrum of Ag 3d for the Ag_3VO_4. The peaks at 367.9 eV and 374.0 eV revealed the presence of Ag^+, which was homologous to the Ag $3d_{5/2}$ and Ag $3d_{3/2}$ binding energies. Fig. S1c showed the high-resolution spectrum of V 2p for the Ag_3VO_4. The peaks at 516.6 eV and 524.1 eV corresponding to V $2p_{3/2}$ and V $2p_{1/2}$ binding energies showed the existence of V^{5+}. As shown in Fig. S1d, O 1s binding energies of Ag_3VO_4 located at 530.0 eV.

Fig. S2 showed the SEM micrographs of the pure graphene-like MoS_2 and Ag_3VO_4. Fig. S2a showed that graphene-like MoS_2 were stacked and anomaly shaped nanosheets. Fig. S2c showed plenty of irregularly shaped particles.

As shown in Fig. S3, the transfusion of hydroxyl radical scavenger slightly reduced the degradation efficiency of RhB for the 7 wt% graphene-like MoS_2/Ag_3VO_4 composite. However, the immission of EDTA-2Na completely restrained the photocatalytic property of the 7 wt% graphene-like MoS_2/Ag_3VO_4 composite as the radical holes were acquired.

Fig. S4 showed the cycling runs of 7 wt% graphene-like MoS_2/Ag_3VO_4 composite

for the degradation of RhB under the visible light irradiation, which suggested that the photocatalytic activity did not change apparently after four cycling experiments.

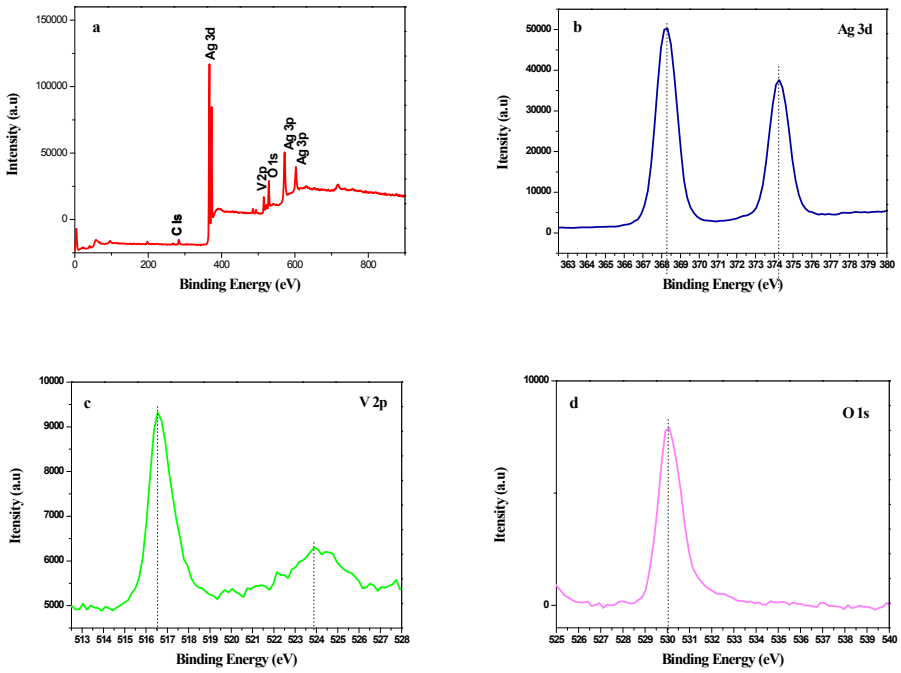

Fig. S1. XPS spectra of the sample: (a) the survey scan of the pure Ag_3VO_4; (b) Ag 3d, (c) V 2p and (d) O 1s of the pure Ag_3VO_4.

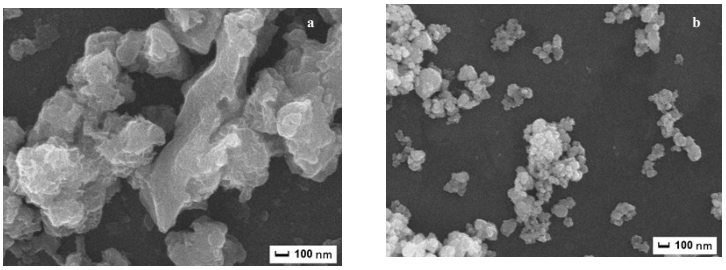

Fig. S2. SEM micrographs of the samples: (a) Pure graphene-like MoS_2 and (b) Pure Ag_3VO_4.

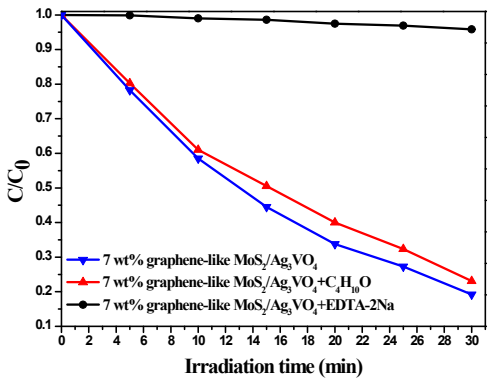

Fig. S3. Plots of photogenerated active species for the photodegradation of RhB by 7wt% graphene-like MoS_2/Ag_3VO_4 composite under visible light illumination.

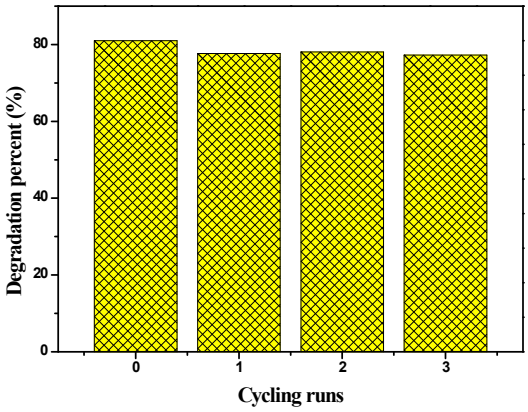

Fig. S4. Cycling runs of 7 wt% graphene-like MoS_2/Ag_3VO_4 composite for the degradation of RhB under the visible light irradiation