Electronic Supplementary Material (ESI) for CrystEngComm.

Electronic Supporting Information

Biomineralized Vaterite derived Efficient solid-state synthesis of pure $CaMnO_3$ Perovskite as an effective photocatalyst

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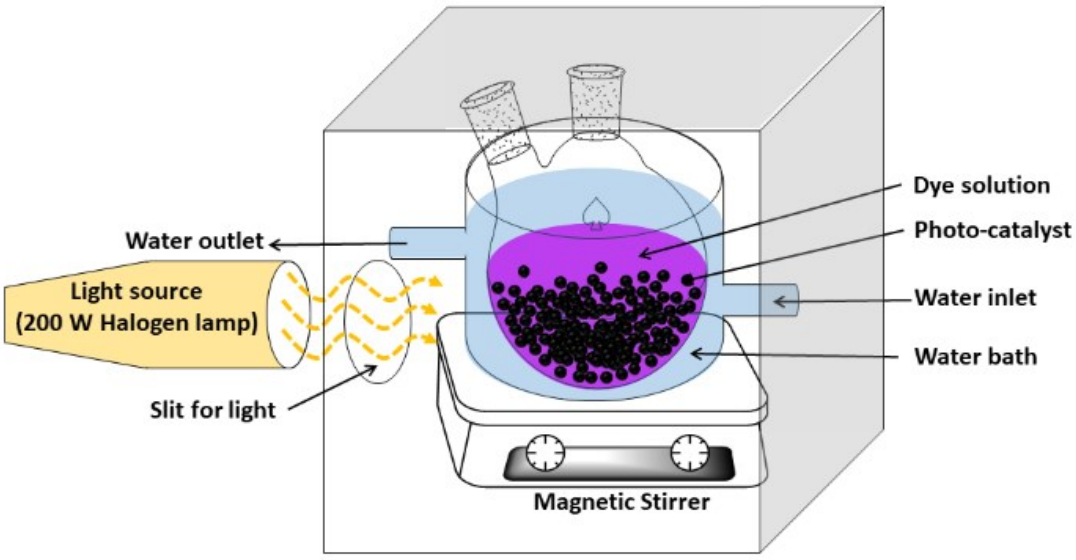

Scheme S1: Illustration of the photocatalytic device set up.

The wavelength spectrum of the light source (200 W Halogen lamp) was obtained from Spectroradiometer CS-200 (Konica Minolta). The experiment was performed by keeping the light source at a distance of 2 m from the spectroradiometer. The intensity of the light was found out to be 11507.13 cd/m^2 and the wavelength spectrum was obtained in the range of 380-780 nm, Fig. S1.

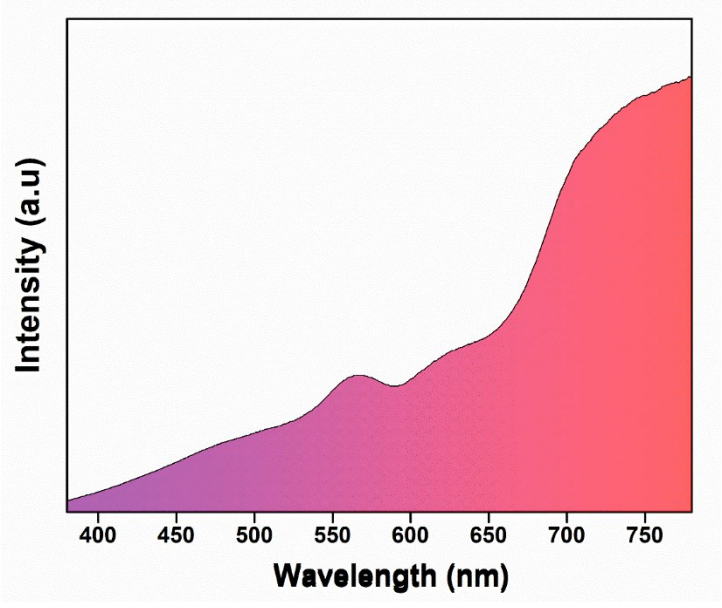

Figure S1: Wavelength spectrum of the 200 W Halogen lamp.

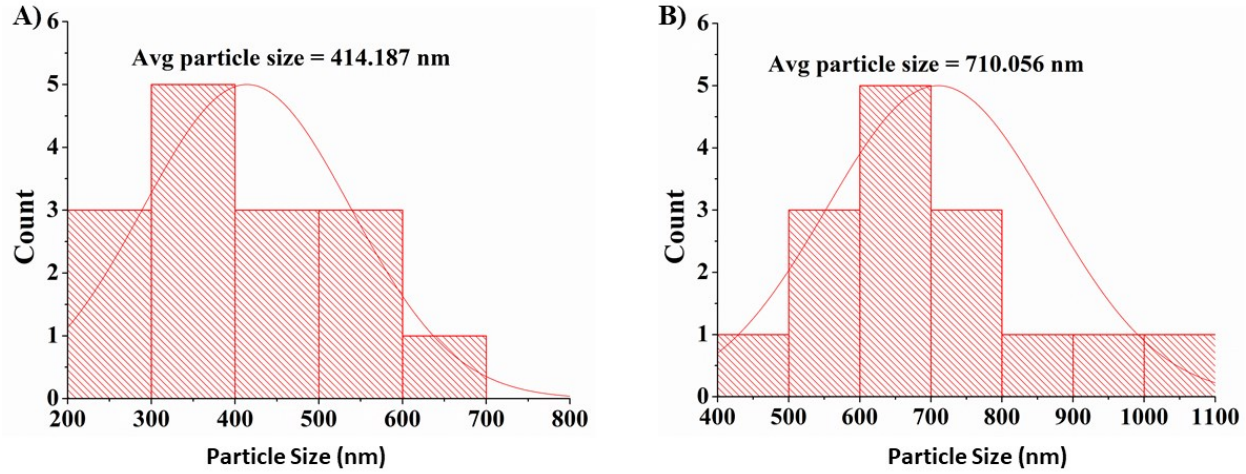

Figure S2: Average particle size of (A) pure $CaMnO_3$ particles; (B) Mixed phase CMOs.

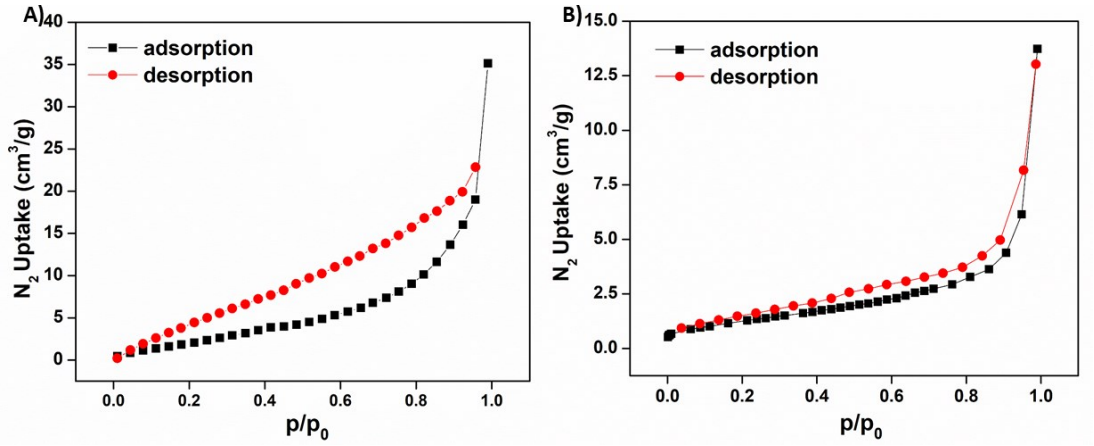

Figure S3: Nitrogen adsorption-desorption BET isotherm (A) $CaMnO_3$; (B) Mixed Phase.

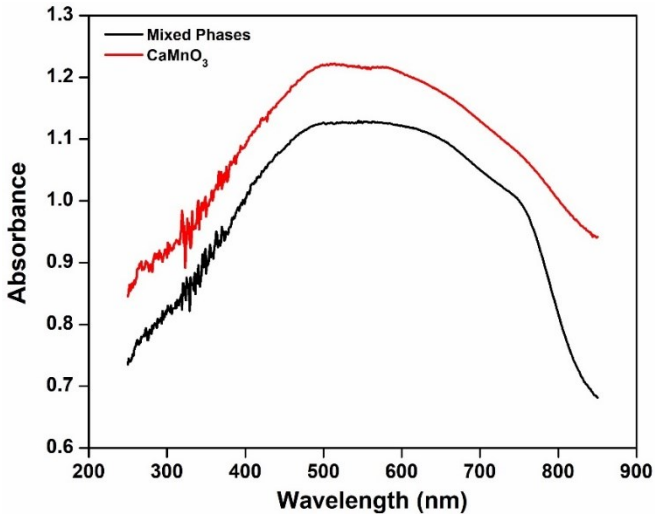

Figure S4: UV/visible diffuse reflectance spectra of $CaMnO_3$ and the mixed phase CMOs.

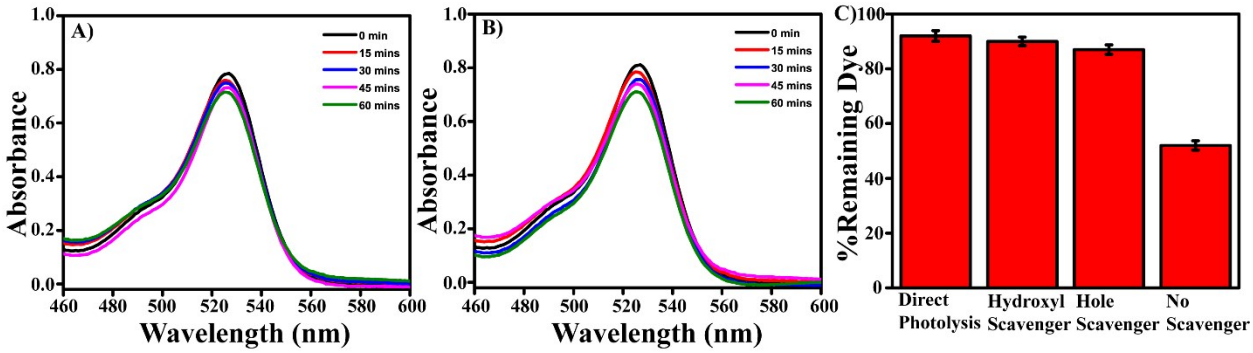

Figure S5: UV/Vis absorption spectra of the photolytic degradation of Rhodamine 6G catalyzed by $CaMnO_3$ in the presence (A) $^{\bullet}OH$ scavenger; (B) h^+ scavenger; and (C) Percentage degradation of Rhodamine 6G in the presence and absence of the scavengers.

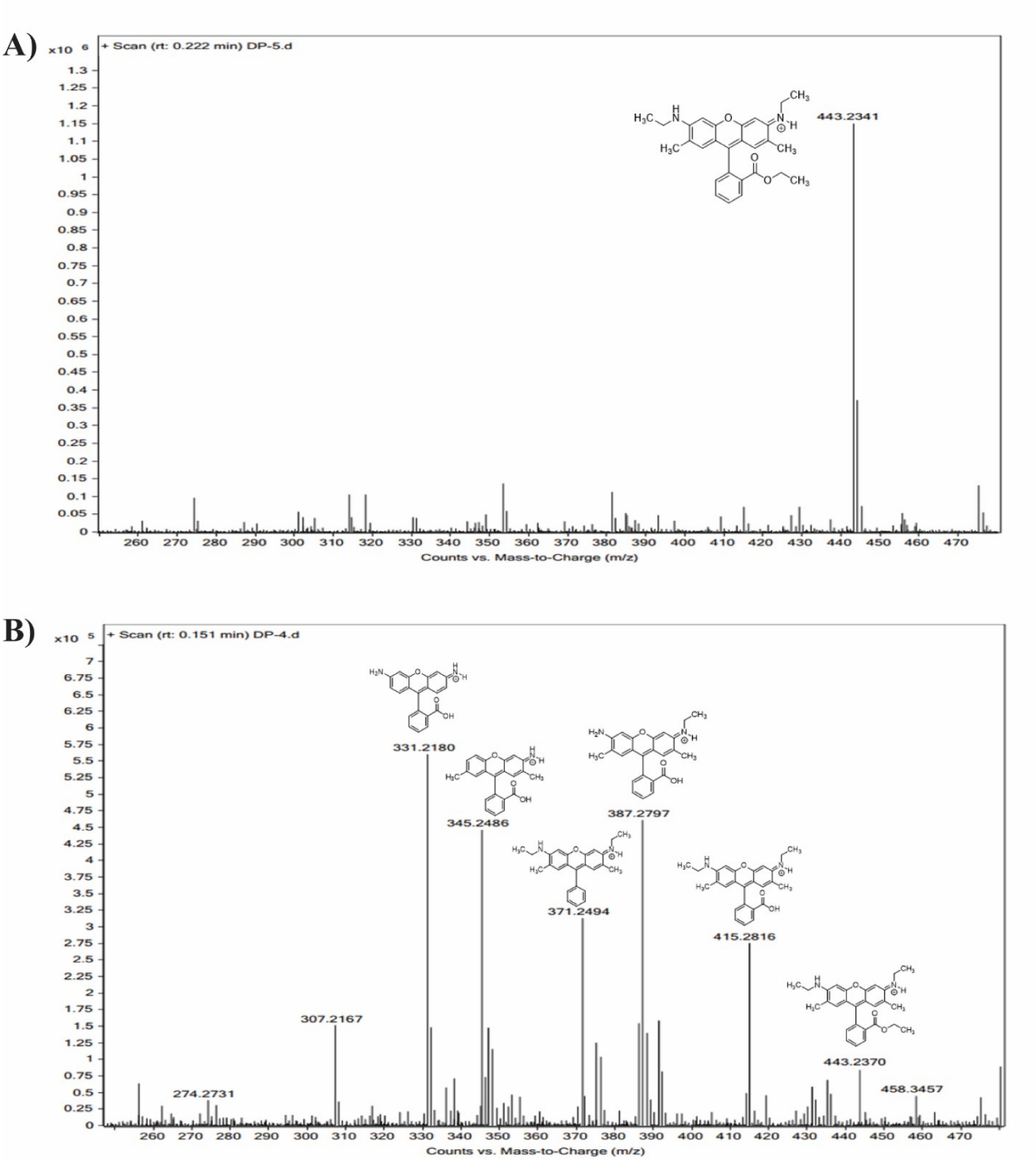

Figure S6: Mass spectrum of Rh 6G (A) before light irradiation; (B) after 2 hours of light irradiation.

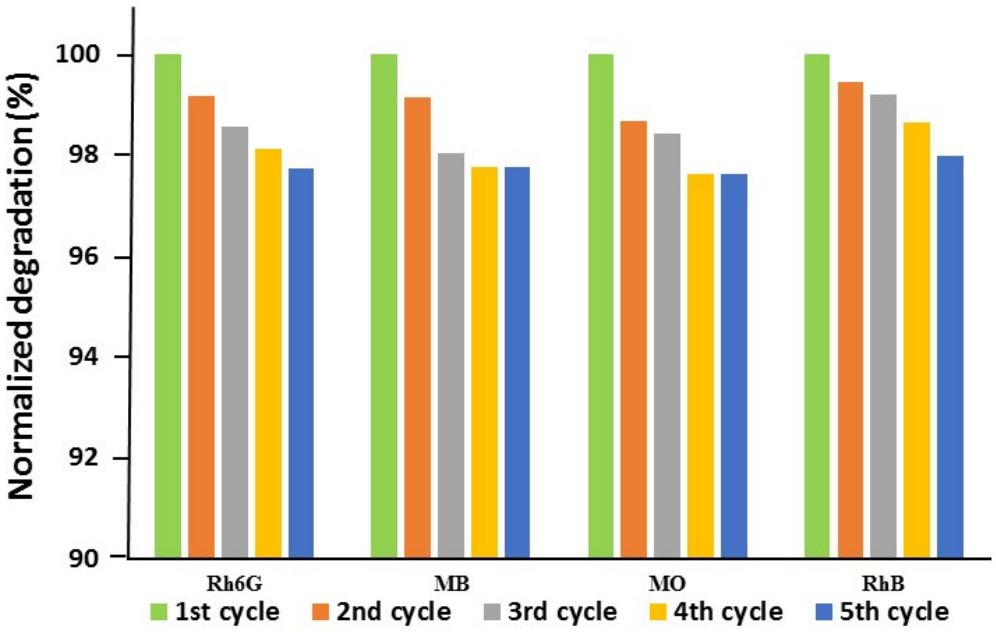

Figure S7: Normalized dye-degradation percentages of the different dyes upon recyclability and reusability.

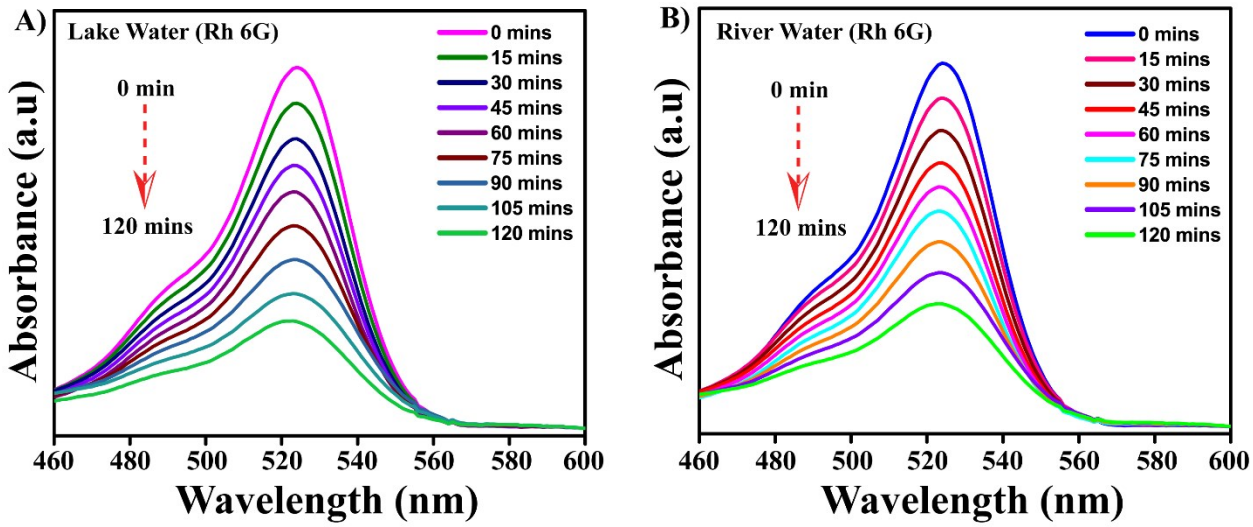

Figure S8: UV/Vis absorption spectra of the photolytic degradation of Rhodamine 6G catalyzed by $CaMnO_3$ performed in (A) Lake water and (B) River water.

Table S1: Photocatalytic activity of calcium manganese oxides towards the degradation of Rhodamine 6G

Reference	**Photocatalyst**	**Time (mins)**	**Percentage of Degradation (%)**
J. Phys. Chem., *C* 2014, **118**, **41**, 24127–24135	$CaMn_3O_6$	240	82
J. Solid State Chem., 2020, **288**, 121390	$CaMnO_3$	180	62
	$CaMn_2O_4$	180	61
	$Ca_2Mn_3O_8$	180	32
This work	**$CaMnO_3$**	**120**	**72**