Electronic Supplementary Material (ESI) for Dalton Transactions.

Supplementary Information

MnO_x-modified ZnAl-LDOs as high-performance adsorbent for the removal of methyl orange

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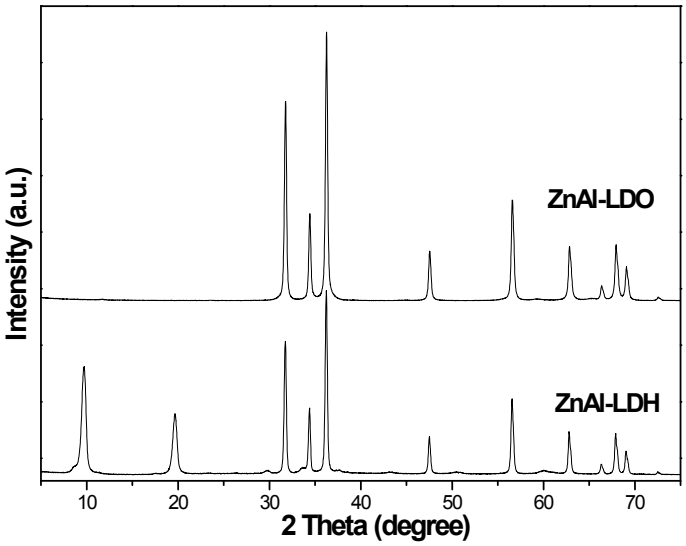
SI-1 XRD patterns of ZnAl-LDH and ZnAl-LDO by calcining at 873 K for 2 h.

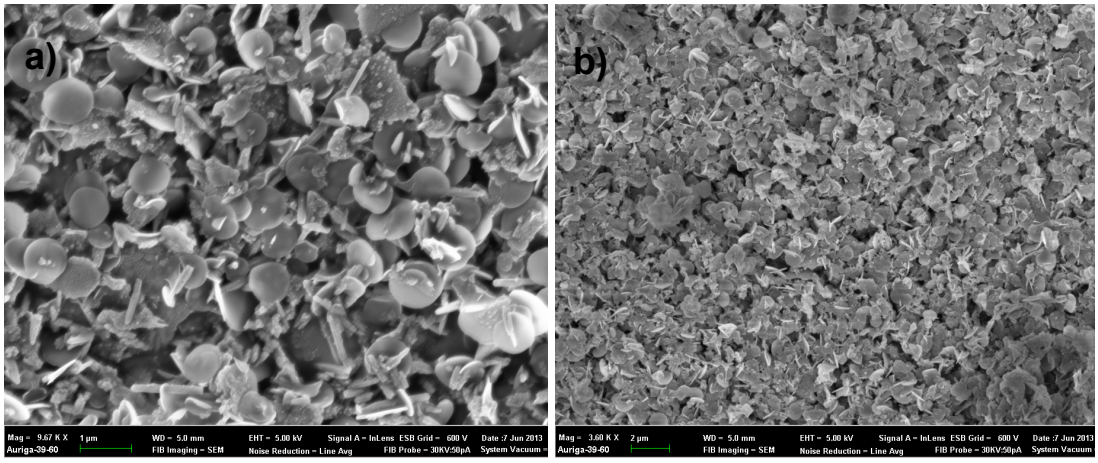


SI-2 Indexing of XRD patterns of samples

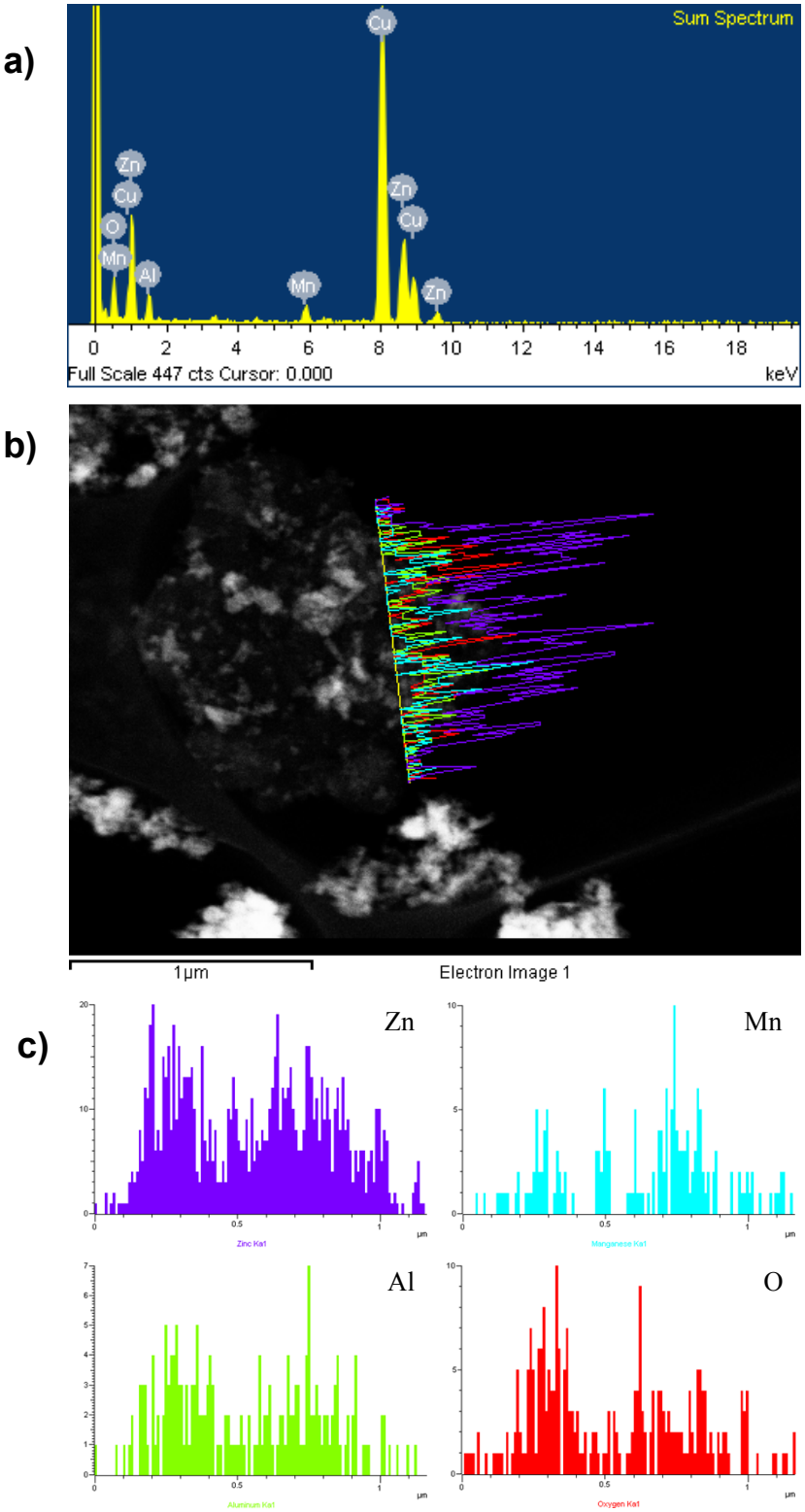
Sample	d_{003} (nm)	d_{006} (nm)	d_{110} (nm)	Crystallite Size in *c* direction (nm)	Crystallite Size in *a* direction (nm)
ZnAl-LDH	0.91074	0.45042	0.15387	2.71737	0.30774
MnO_4^-/ZnAl-LDH	0.77815	0.38210	0.15368	2.31353	0.30736
R-MnO_4^-/ZnAl-LDH	0.80908	0.38645	0.15346	2.37297	0.30692

Note: *c* was the average value of $3d_{003}$, $6d_{006}$, $9d_{009}$; $a = 2\ d_{110}$.

SI-3 SEM image of the (a) pristine ZnAl-LDH, (b) ZnAl-LDO.

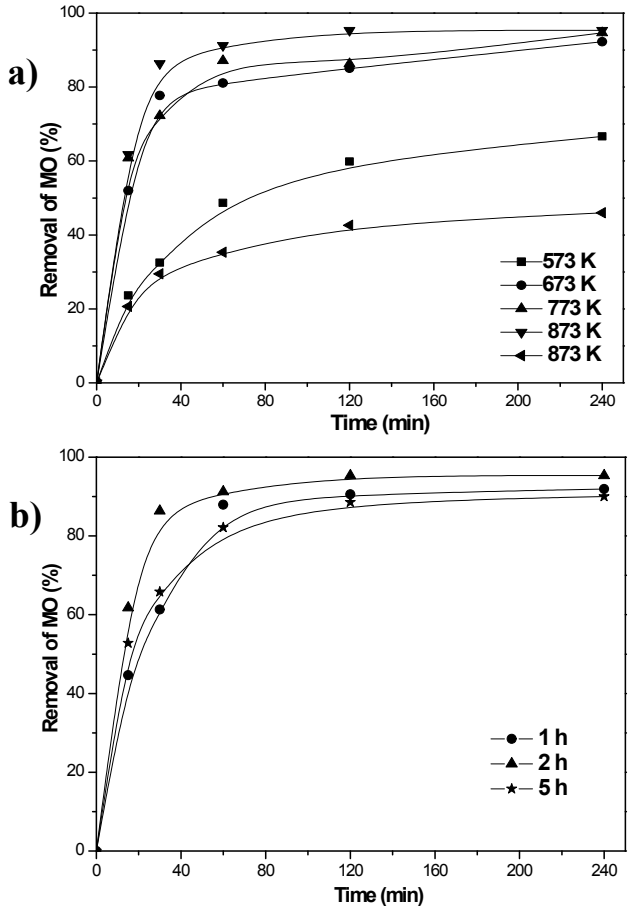


SI-4 a) Energy dispersive X-ray (EDX) spectrum of M-LDO; b) and c) EDX line mapping data of M-LDO.

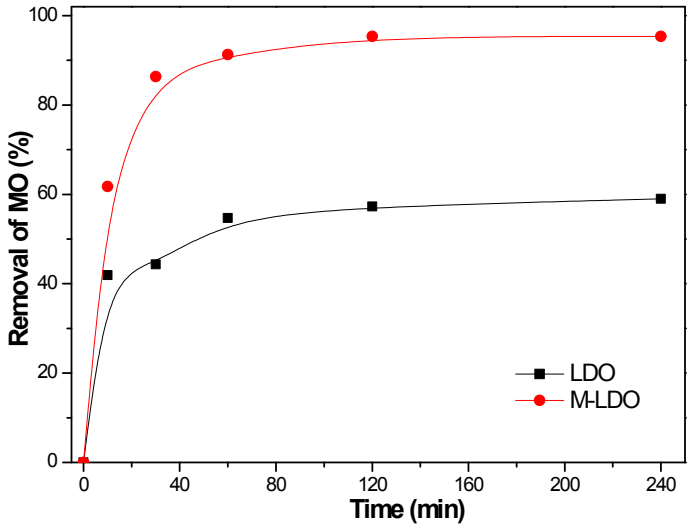


Note that the presence of Cu element was because of the use of copper grid for the TEM characterization.

SI-5 Effect of calcinations process on the adsorption properties for MO removal: a) at different temperature for 2 h and b) at 873 K for different time. The tests were carried out at the same conditions: adsorbent dosage, 0.01 g; MO solution, 10 mg L^{-1}, 100 mL; reaction temperature at 303 K.



SI-6 Effect of different adsorbents on the adsorption properties of MO removal: the tests were carried out at the same conditions: adsorbent dosage, 0.01 g; MO solution, 10 mg L^{-1}, 100 mL; reaction temperature at 303 K.



SI-7 Pseudo–first–order and Pseudo–second–order model constants and coefficients for adsorption of MO on M-LDO at 303 K.

C_0	$q_{e,\,exp}$	Pseudo-first-order kinetic model			Pseudo-second-order kinetic model		
(mg L^{-1})	(mg g^{-1})	$q_{e,\,cal}$ (mg g^{-1})	k_1 (h^{-1})	R^2	$q_{e,\,cal}$ (mg g^{-1})	k_2 (g mg^{-1} h^{-1})	R^2
80	399.9572	388.9322	1.4922	0.9823	406.5041	0.0068	0.9999
120	525.4919	504.7214	1.2337	0.9764	537.6344	0.0033	0.9996
160	576.0231	537.1717	0.9035	0.9560	588.2353	0.0018	0.9987
200	599.0304	583.9004	0.9603	0.9705	609.7561	0.0023	0.9995
300	605.7432	569.8001	0.9914	0.9723	617.2840	0.0020	0.9989
400	616.6440	578.381	0.9241	0.9641	632.9114	0.0016	0.9974

SI-8 XRD patterns of M-LDO (a) after the first time adsorption of MO (R0) and (b) after five regenerations (R5).