Electronic Supplementary Material (ESI) for Nanoscale.

Electronic supplementary information

Synthesis and formulation of functional bionanomaterials with superoxide dismutase activity

Marko Pavlovic, Paul Rouster and Istvan Szilagyi*

Department of Inorganic and Analytical Chemistry, University of Geneva, 30 Quai Ernest-Ansermet, CH-1205 Geneva, Switzerland

**Corresponding author. Email: istvan.szilagyi@unige.ch. Phone: +41223796031.*

Table S1. Assignation of the IR peaks originating from the bare and the composite materials.

Material	Wavenumber (cm^{-1})	Assignation
$Mg/Al-CO_3$-LDH	552	Al-OH translation
	665	CO_3^{2-} υ4
	777	Al-OH translation
	941	Al-OH deformation
	1351	CO_3^{2-} υ3
SOD	1522	CONH bending vibration
	1633	C=C stretching vibration
$Mg/Al-CO_3$-LDH-SOD	552	Al-OH translation ($Mg/Al-CO_3$-LDH)
	665	CO_3^{2-} υ4 ($Mg/Al-CO_3$-LDH)
	777	Al-OH translation ($Mg/Al-CO_3$-LDH)
	941	Al-OH deformation ($Mg/Al-CO_3$-LDH)
	1351	CO_3^{2-} υ3 ($Mg/Al-CO_3$-LDH)
	1522	CONH bending vibration (SOD)
	1633	C=C stretching vibration (SOD)

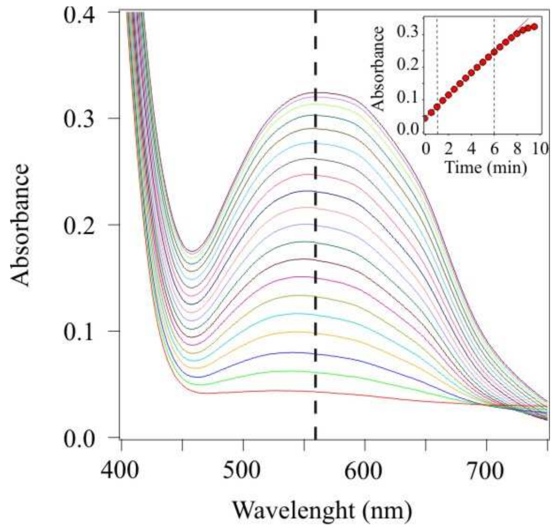

Figure S1. Spectrophotometric detection of SOD activity based on the Fridovich assay. The NBT reduction is followed through the development of the absorbance band at 565 nm (dashed line). No increase in the absorbance at this wavelength indicates 100 % inhibition and that all of the superoxide radicals were captured by the enzyme. The inset shows the increase in the absorbance at 565 nm with the reaction time in an individual experiment.

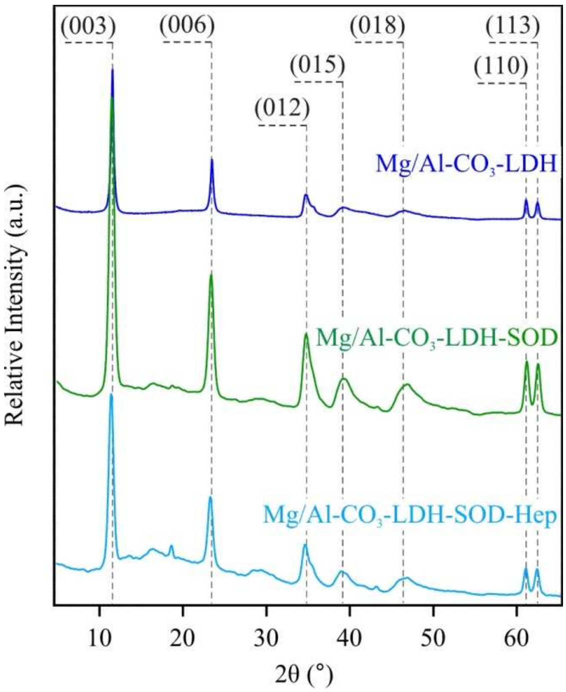

Figure S2. XRD pattern of the Mg/Al-CO_3-LDH, Mg/Al-CO_3-LDH-SOD and Mg/Al-CO_3-LDH-SOD-Hep materials.

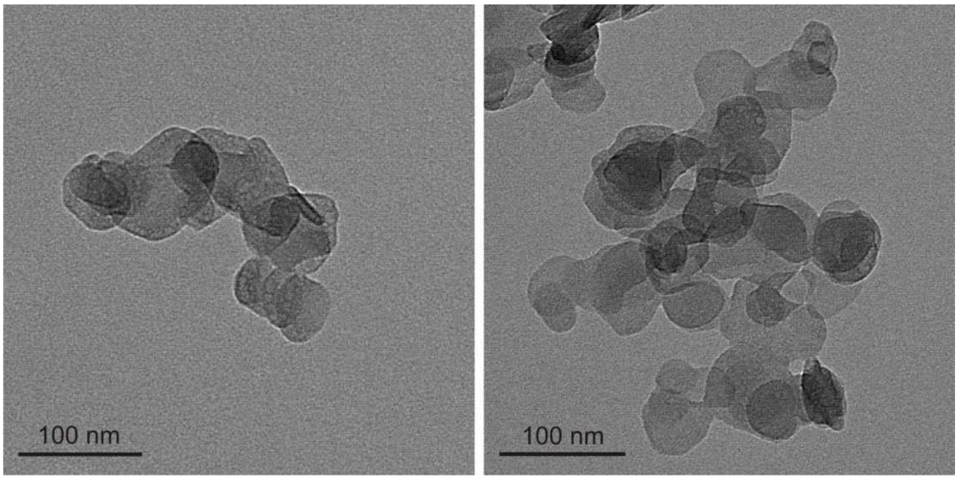

Figure S3. TEM images of the bare Mg/Al-CO_3-LDH particles obtained by drying the stable dispersions in the instrument prior to the measurement.

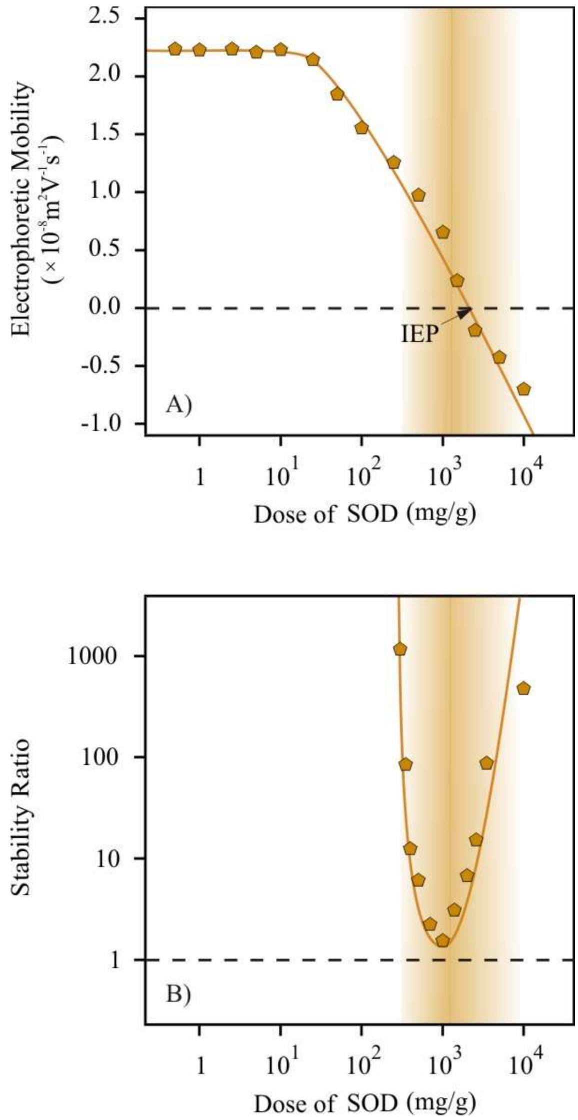

Figure S4. Electrophoretic mobilities (A) and stability ratios (B) of Mg/Al-CO_3-LDH particles at different SOD doses. The experiments were performed at pH 7.5 and at 1 mM ionic strength set by NaCl.

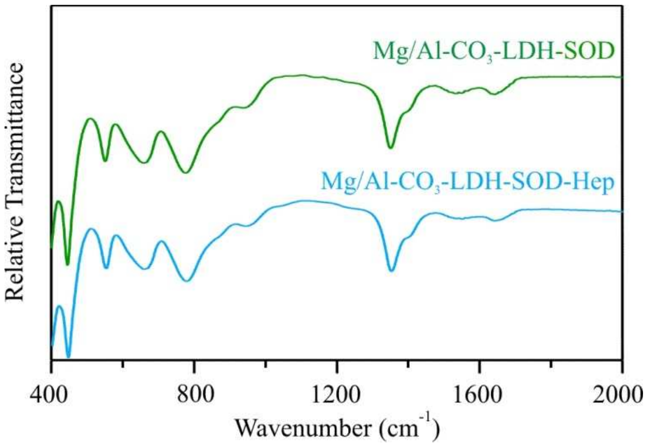

Figure S5. IR spectra of Mg/Al-CO_3-LDH-SOD and Mg/Al-CO_3-LDH-SOD-Hep materials.

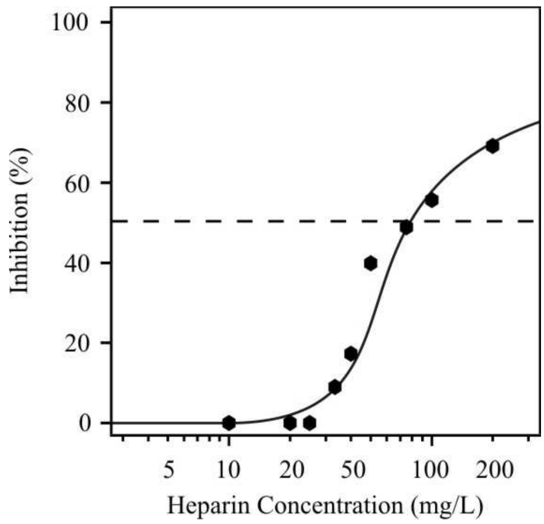

Figure S6. Inhibition of NBT reduction as a function of the heparin concentration in the Fridovich assay. The SOD-like activity is due to the formation of the heparin-xanthine oxidase complexes and subsequent hindrance in the superoxide radical production and not due to their dismutation by heparin.

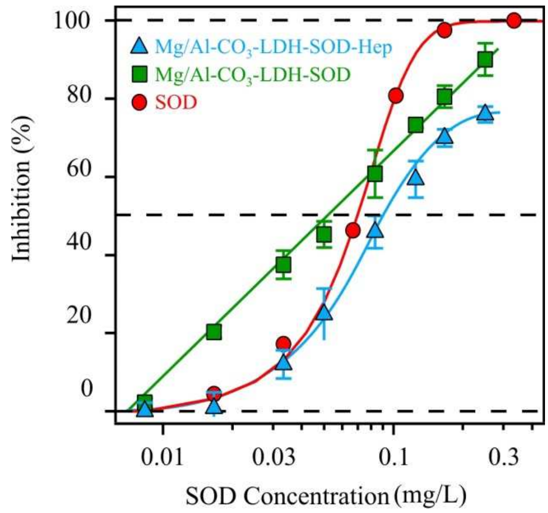

Figure S7. Inhibition of NBT reduction by superoxide radicals as a function of the SOD concentration applied in the Fridovich assay. The activities of commercially available SOD (circles), Mg/Al-CO_3-LDH-SOD (squares) and Mg/Al-CO_3-LDH-SOD-Hep (triangles) are shown for comparison. The polyelectrolyte dose was 20 mg/g for the Mg/Al-CO_3-LDH-SOD-Hep material.