Nano-dispersed Zn-Al double hydroxide and oxides for photocatalytic application

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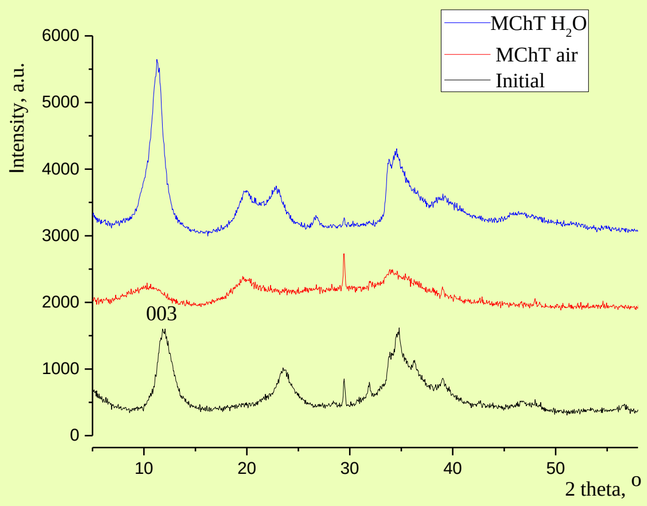
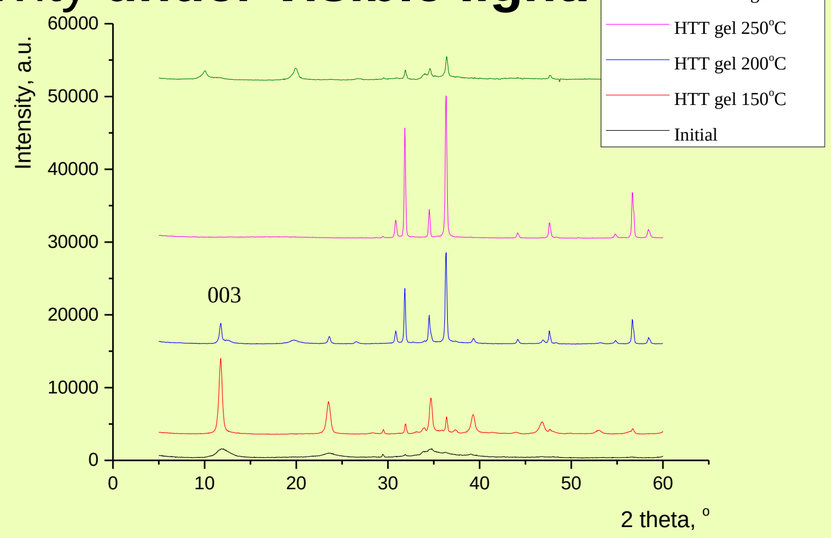
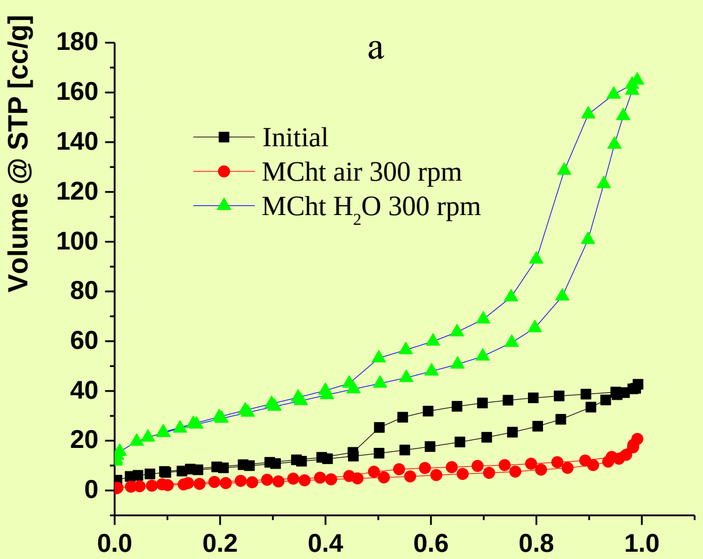
The aim of the study: HTT *(hydrothermal)* and MChT (*mechanochemical*) treatments influence on physicochemical properties of precipitated Zn/Al layered double hydroxides (LDH) and, consequently, its physicochemical properties photocatalytic activity **under visible light.**

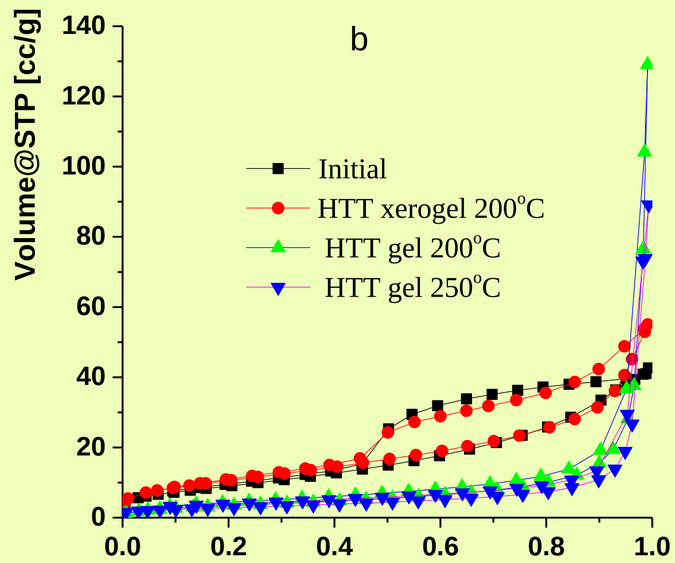
XRD patterns for initial and modified samples after HTT and MChT

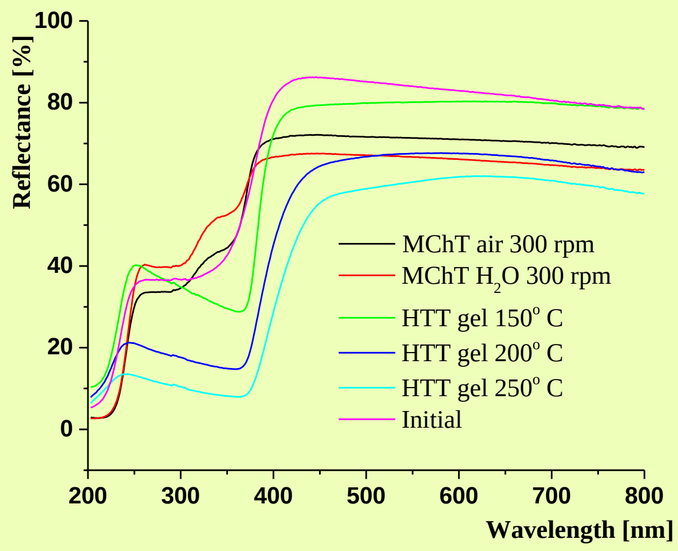




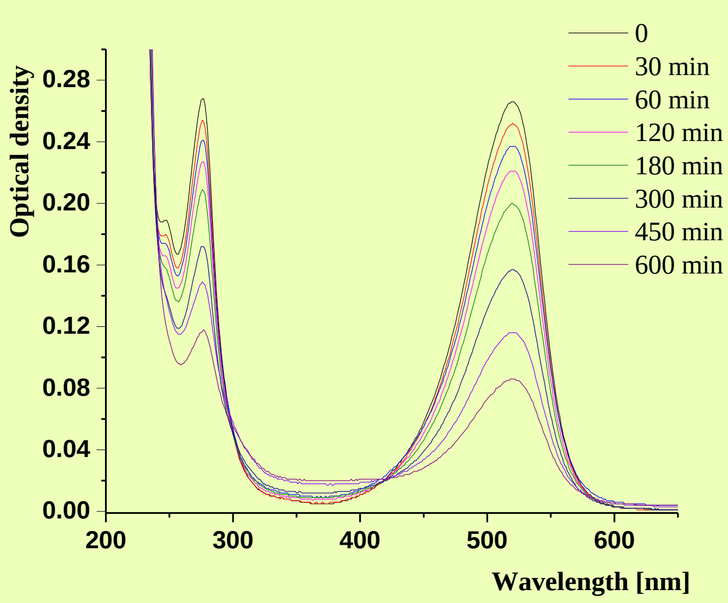
The nitrogen-adsorption desorption for modified samples after MChT (a) and HTT (b)



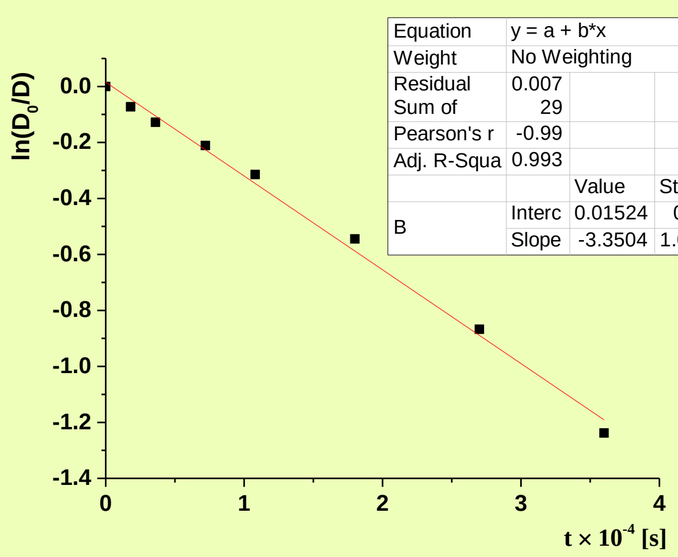




UV-Vis spectra for initial and modified samples



The spectra of safranin T solution after visible irradiation in the presence of sample after HTT of gel at 200 C as photocatalyst and kinetic curve of safranin T degradation



Some physicochemical and photocatalytic characteristics of initial and modified samples

Designation	S [m^2/g]	V [cm^3/g]	d [nm]	E_g, [eV]	K_d 10^5 [s^{-1}] / C [%]
Initial	33	0.07	3.8	3.21	0.11 / 6
HTT-gel-150	50	0.70	3.3	3.04	2.61 / 59
HTT-gel-200	67	0.76	30.0	2.94	3.35 / 71
HTT-gel-250	11	0.25	31.5	2.84	2.46 / 56
HTT-xero-200	40	0.25	3.8	3.13	1.83 / 50
MChT-air-300	12	0.03	3,7	3.08	1.78 / 47
MChT-H2O-300	106	0.26	3.8	3.23	1.93 / 53

Conclusions. Therefore, mechanochemical and hydrothermal treatments allow to vary the physicochemical characteristics of Zn-Al hydrotalcite. In particular, the samples, which are oxide-hydroxide compositions, were prepared by HTT of gel at low temperature. **These compositions, namely zinc oxide dispersed in interlayer space of hydrotalcite, absorb visible light and possess photocatalytic activity under visible irradiation.** Thus, degree of safranin T degradation reaches C=71% for 10 h of illumination.