

High-yield microwave synthesis of layered $\text{Y}_2(\text{OH})_5\text{NO}_3 \cdot x\text{H}_2\text{O}$ materials

Yapryntsev A.D.^{1,2}, Baranchikov A.E.², Skogareva L.S.², Goldt A.E.², Stolyarov I.P.²,
Ivanova O.S.², Kozik V.V.³, Ivanov V.K.^{2,3}

¹ Lomonosov Moscow State University, Moscow 119991, Russia

² Kurnakov Institute of General and Inorganic Chemistry of the Russian Academy of Sciences,
Moscow 119991, Russia

³ National Research Tomsk State University, Tomsk 634050, Russia

ESI:

Table S1. Synthesis conditions of LYH samples and reaction yields.

Sample name	Concentrations of Y(NO ₃) ₃ , HMT, NaNO ₃ , M	Temperature, °C	Heating rate, °C/min; duration of treatment, min	Reaction yield, %
Y18	0.033, 0.048, 0	180	35; 30	-
Y18N-	0.033, 0.048, 0.17	180	35; 30	-
Y18N_HH	0.033, 1.4, 0.33	180	35; 30	88
Y18N_LH	0.033, 0.048, 0.33	180	35; 30	88
Y18NN	0.033, 0.048, 0.66	180	35; 30	78
Yt10	0.033, 0.048, 0.33	100	35; 30	31
Yt14	0.033, 0.048, 0.33	140	35; 30	68
Yt22	0.033, 0.048, 0.33	220	35; 30	80
YC0.09	0.001, 0.002, 0.01	180	35; 15	42
YC0.15	0.005, 0.007, 0.05	180	35; 15	39
YC0.3	0.01, 0.014, 0.1	180	35; 15	-
YC2	0.066, 0.095, 0.66	180	35; 30	98
YC5	0.17, 0.24, 50	180	35; 30	97
YC10	0.33, 0.48, 3.3	180	35; 30	92
Ysp160	0.033, 0.048, 0.33	180	160; 0	86
Ysp16	0.033, 0.048, 0.33	180	16; 0	81
Yd1	0.033, 0.048, 0.33	180	35; 1	82
Yd3	0.033, 0.048, 0.33	180	35; 3	72
Yd10	0.033, 0.048, 0.33	180	35; 10	79
Yd120	0.033, 0.048, 0.33	180	35; 120	-

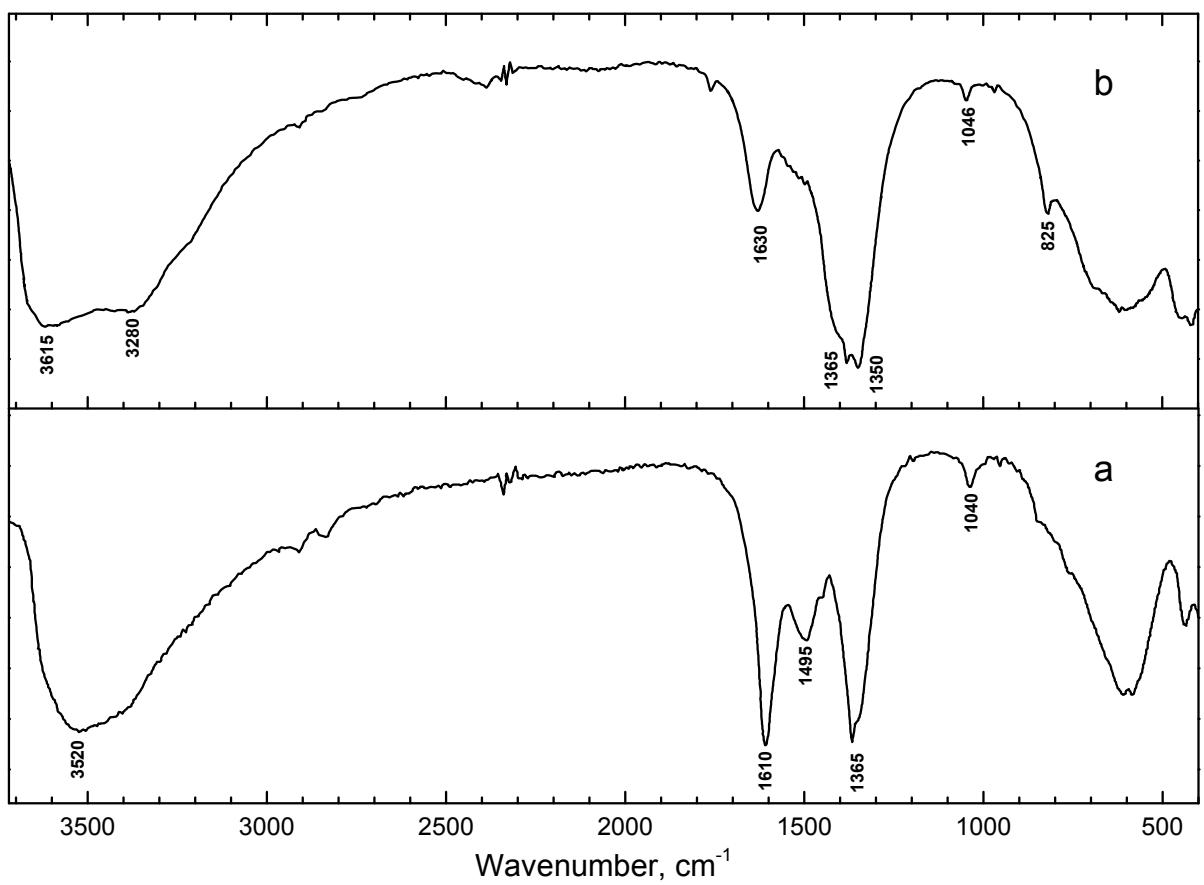


Fig. S1. FTIR spectra of LYH samples synthesized from reaction mixtures containing no sodium nitrate (**a**) and 0.33 M of sodium nitrate (**b**)

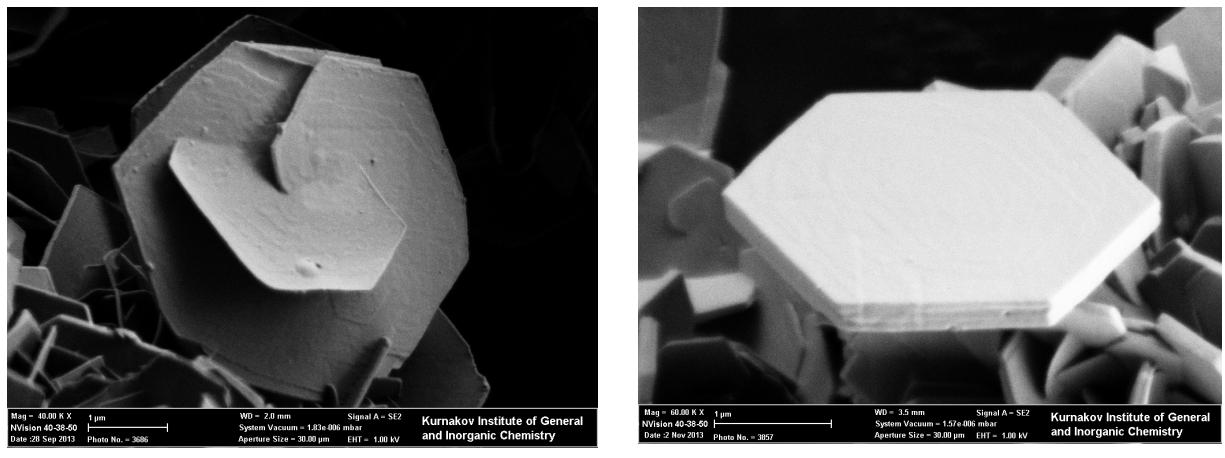


Fig. S2. SEM images of LYH samples synthesized from reaction mixtures containing no sodium nitrate (**a**) and 0.33 M of sodium nitrate by MWHT treatment at 180 °C for 30 min (**b**).

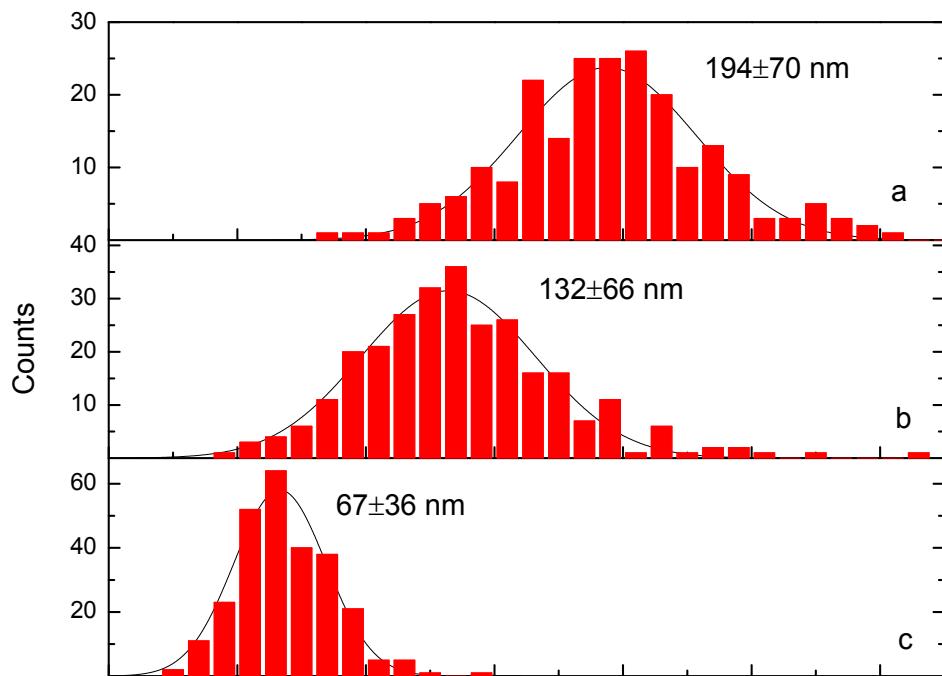


Fig. S3. Particle thickness distributions (as calculated from SEM images) for LYH samples synthesized from 30 mL of reaction mixtures of different concentrations: 0.33 M $\text{Y}(\text{NO}_3)_3$, 0.48 M HMT, 3.3 M NaNO_3 (**a**); 0.17 M $\text{Y}(\text{NO}_3)_3$, 0.24 M HMT, 1.7 M NaNO_3 (**b**); 0.066 M $\text{Y}(\text{NO}_3)_3$, 0.095 M HMT, 0.66 M NaNO_3 (**c**).

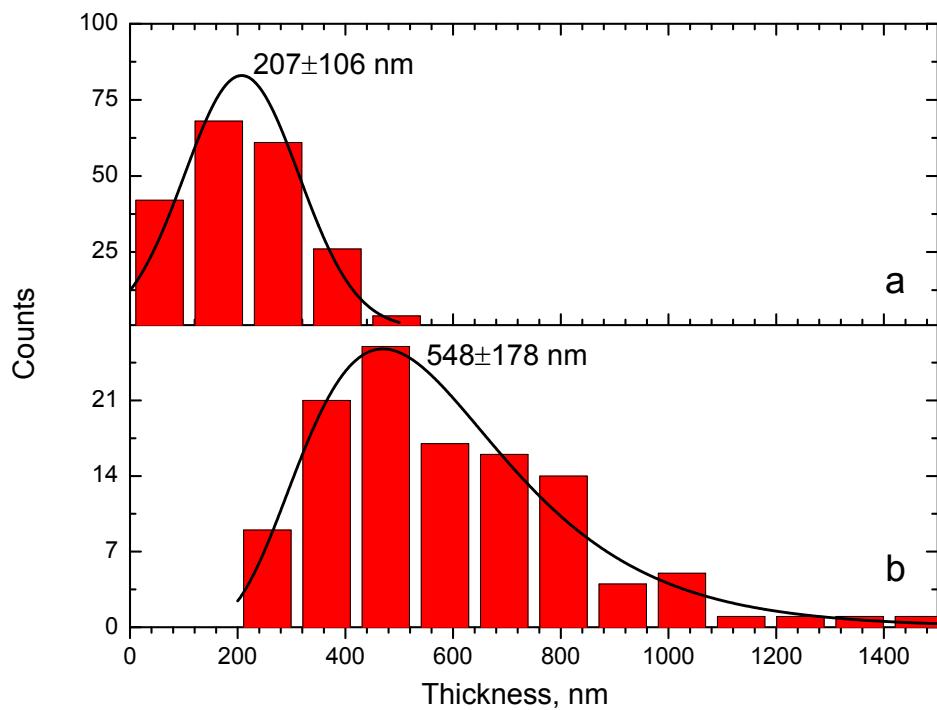
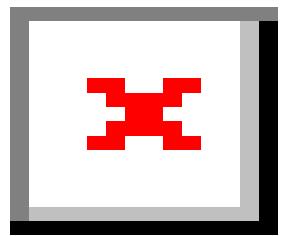
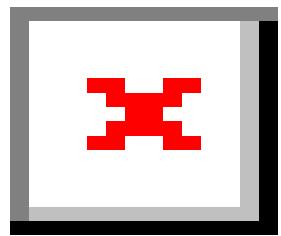


Fig. S4. Particle thickness distributions (as calculated from SEM images) for LYH samples before (**a**) and after (**b**) intercalation by $\text{C}_{12}\text{H}_{25}\text{SO}_4^-$ anions.



a



b

Fig. S5. SEM images of LYH sample before (**a**) and after (**b**) intercalation by $\text{C}_{12}\text{H}_{25}\text{SO}_4^-$ anions.