Supplementary Information

Luminol chemiluminescence actuated by modified natural sepiolite material and its analytical application

Zhihua Wang, Changxin Zhao, Dongmei Han, Fubo Gu*

State Key Laboratory of Chemical Resource Engineering, Beijing University of Chemical Technology, Beijing 100029, China

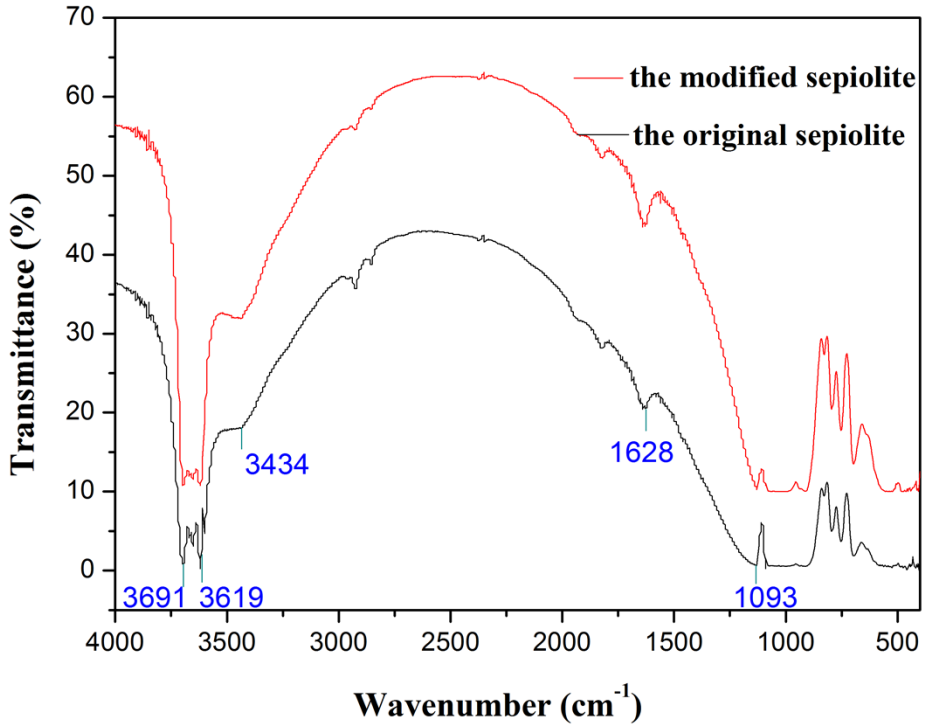

Fig.S1 FTIR spectrum of the original and modified sepiolite.

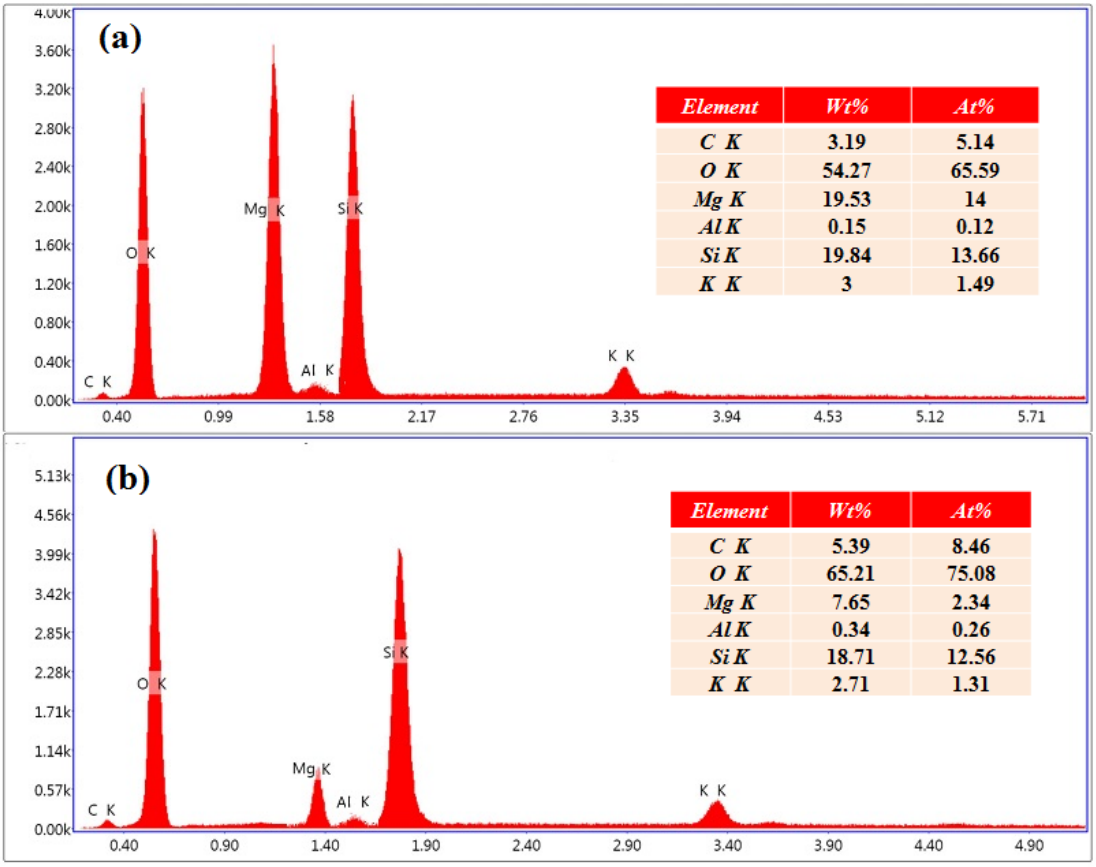

Fig. S2 EDAX analysis of (a) the original sepiolite and (b) the modified sepiolite.

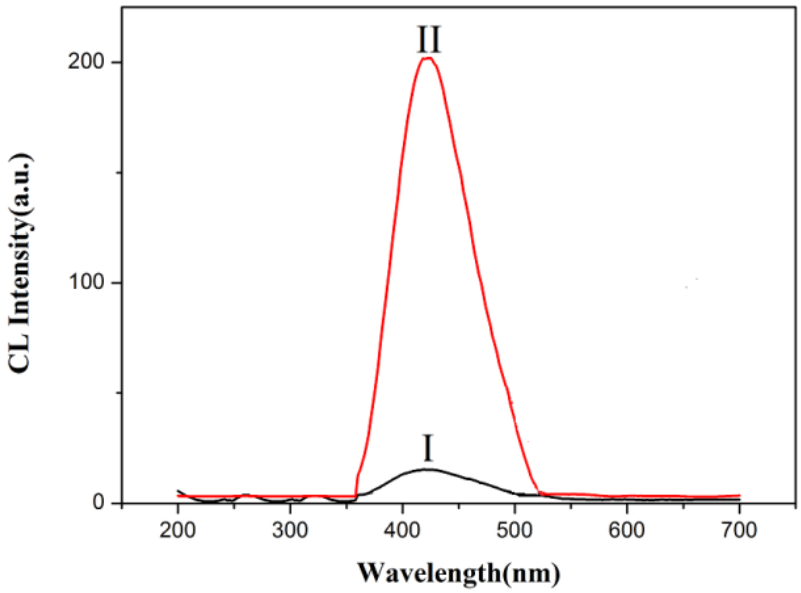

Fig.S3 CL spectra for the luminol-H_2O_2 system in the absence (I) and presence (II) of sepiolite. Conditions: 25 mg·mL^{-1} sepiolite treated at 100 °C for 4 h, the pH of sepiolite was 1.0; 0.08 mM luminol in pH 11.6; 1 mM H_2O_2; the flow rates of P1 and P2 were 2.6 mL·min^{-1} and 2.2 mL·min^{-1}, respectively.

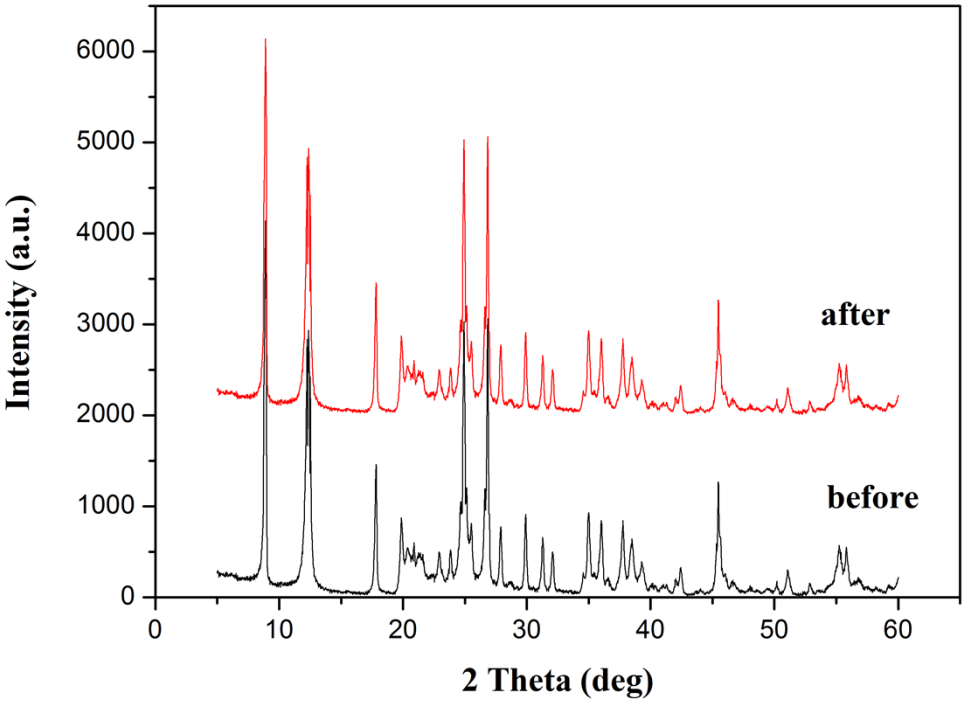

Fig. S4 Powder XRD patterns of sepiolite before and after CL reaction

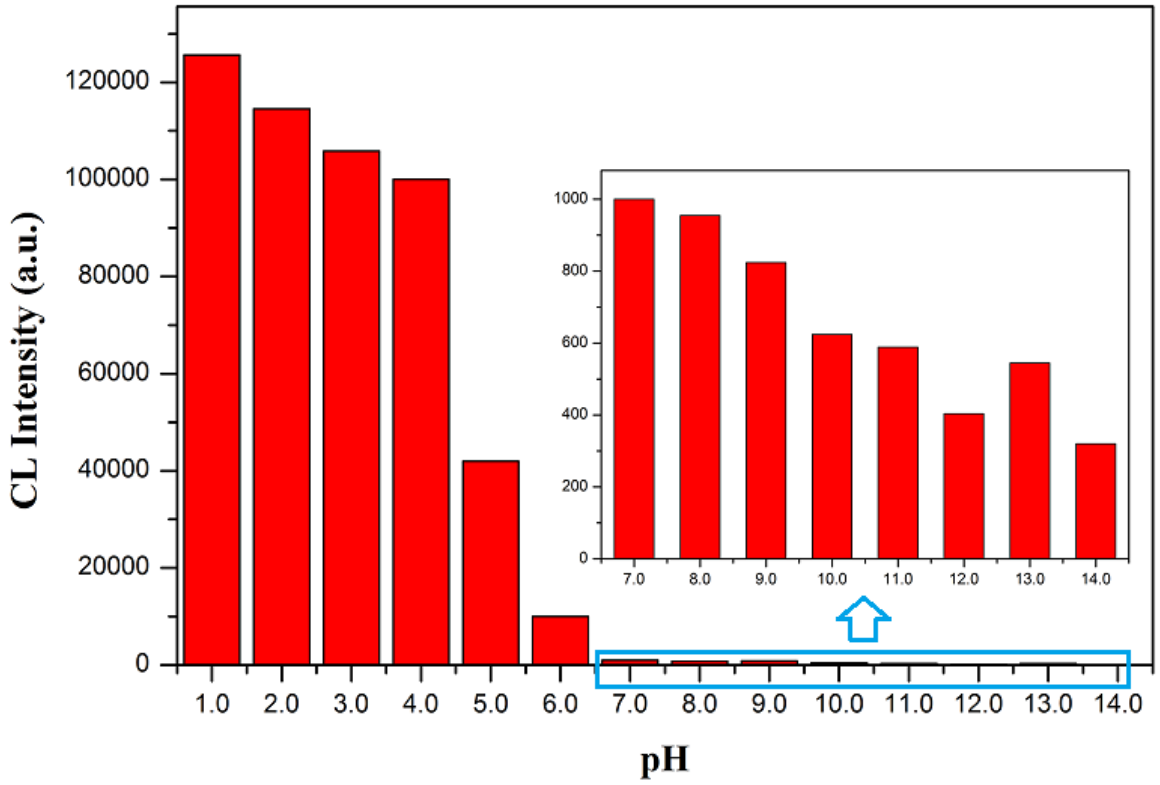

Fig.S5 Effect of the pH of sepiolite on sepiolite catalyzed luminol CL. Conditions: 10 mg·mL^{-1} sepiolite treated at 20 °C for 1 h; 0.2 mM luminol in pH 11.0; 1 mM H_2O_2; 2.0 mL·min^{-1} flow rate.

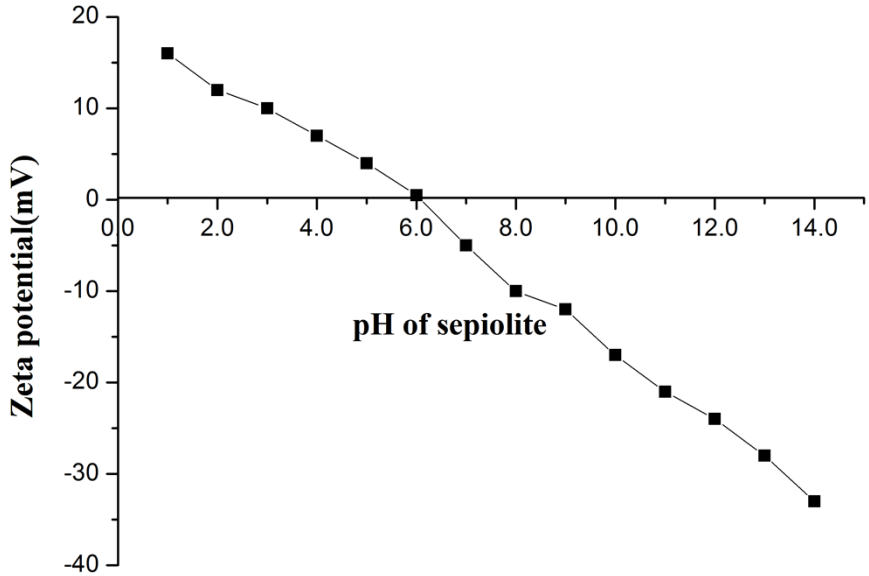

Fig.S6 Effect of the pH of sepioliteon zeta potential. Conditions: 25 mg·mL^{-1} sepiolite treated at 100°C for4 h.

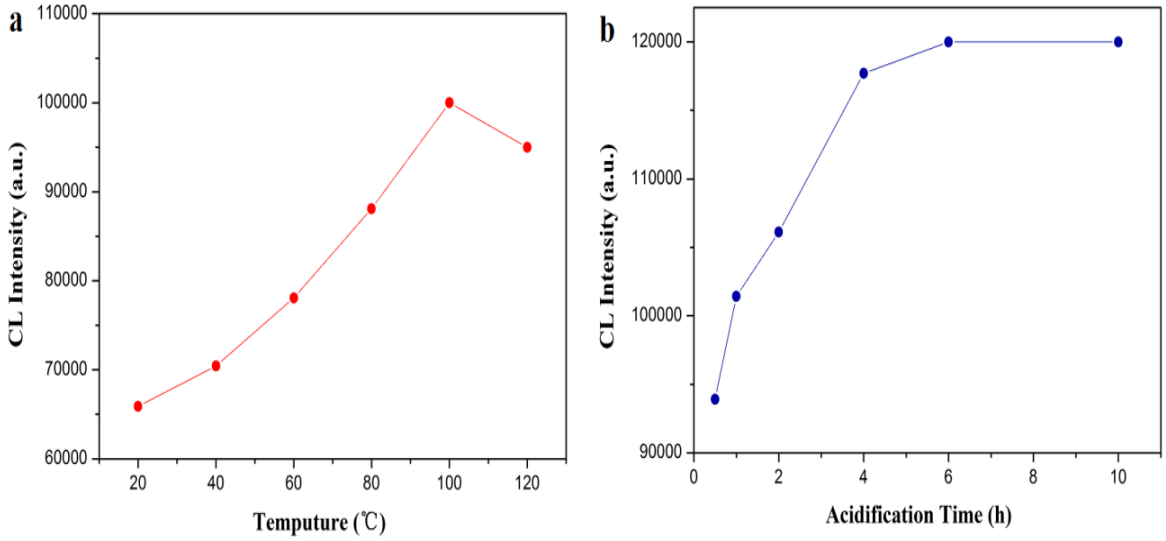

Fig. S7 Effect of the reaction temperature and time of sepiolite on sepiolite catalyzed luminol CL. (a) Reaction temperature of sepiolite: the reaction time was 1 h, the pH of sepiolite was 1.0, the concentration of sepiolite was 10 $mg \cdot mL^{-1}$; 0.2 mM luminol in pH 11.0; 1 mM H_2O_2; 2.0 $mL \cdot min^{-1}$ flow rate. (b) Reaction time of sepiolite: the reaction temperature was 100 °C, the pH of sepiolite was 1.0, the concentration of sepiolite was 10 $mg \cdot mL^{-1}$; 0.2 mM luminol in pH 11.0; 1 mM H_2O_2; 2.0 $mL \cdot min^{-1}$ flow rate.

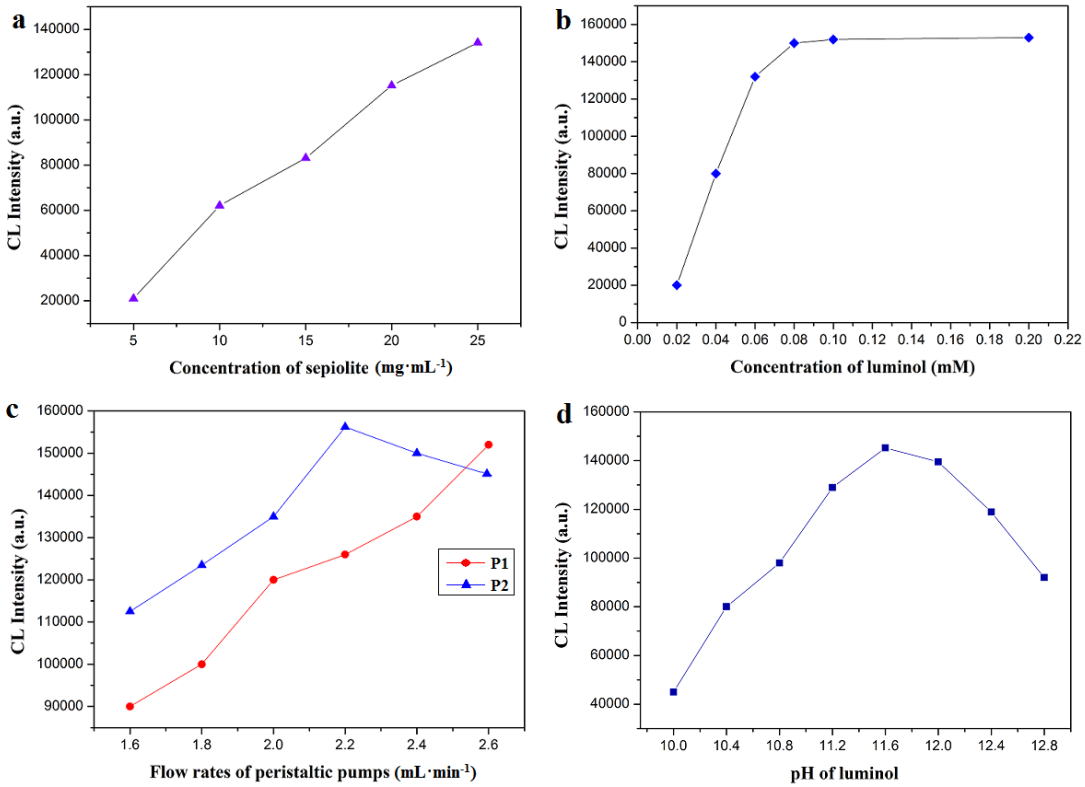

Fig.S8 Effects of the analytical conditions on sepiolite catalyzed luminol CL. The sepiolite was treated at 100 °C for 4 h, the pH of sepiolite was 1.0. (a) Concentration of sepiolite: 0.2 mM luminol in pH 11.0; 1 mM H_2O_2; 2.0 mL·min^{-1} flow rate. (b) Concentration of luminol: 25 mg·mL^{-1} sepiolite; luminol in pH 11.0; 1 mM H_2O_2; 2.0 mL·min^{-1} flow rate. (c) Flow rates of peristaltic pumps: 25 mg·mL^{-1} sepiolite; 0.08 mM luminol in pH 11.0; 1 mM H_2O_2. (d) The pH of luminol: 25 mg·mL^{-1} sepiolite; 0.08 mM luminol; 1 mM H_2O_2; the flow rates of P1 and P2 were 2.6 mL·min^{-1} and 2.2 mL·min^{-1}, respectively.

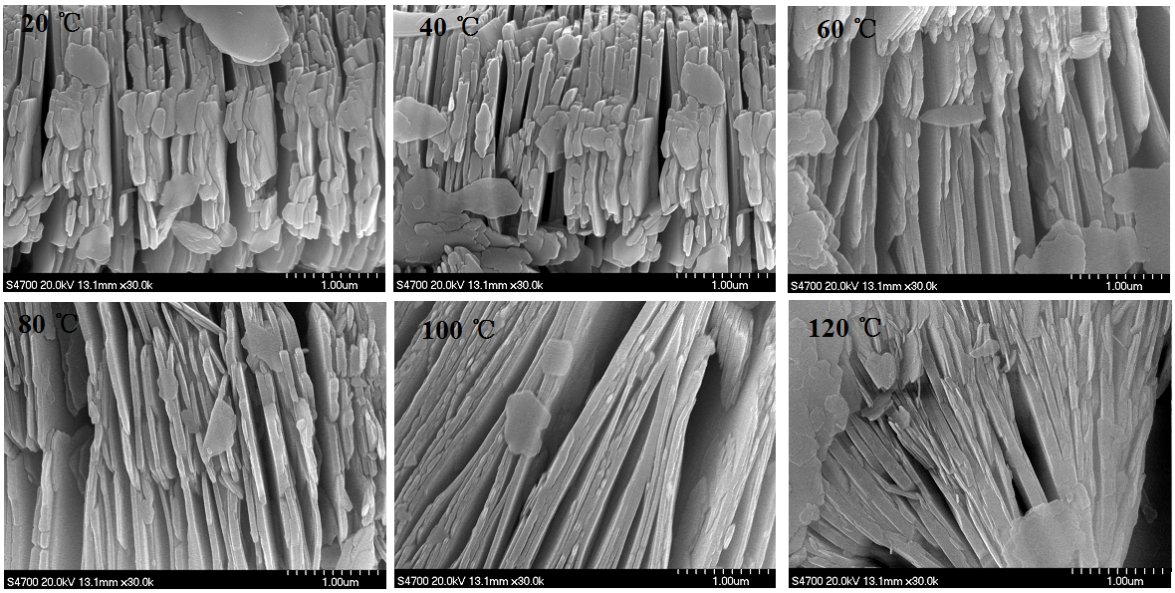

Fig.S9 SEM images of sepiolite with different reaction temperature. Conditions: the reaction time was 1 h, the pH of sepiolite was 1.0, the concentration of sepiolite was 10 $mg \cdot mL^{-1}$.

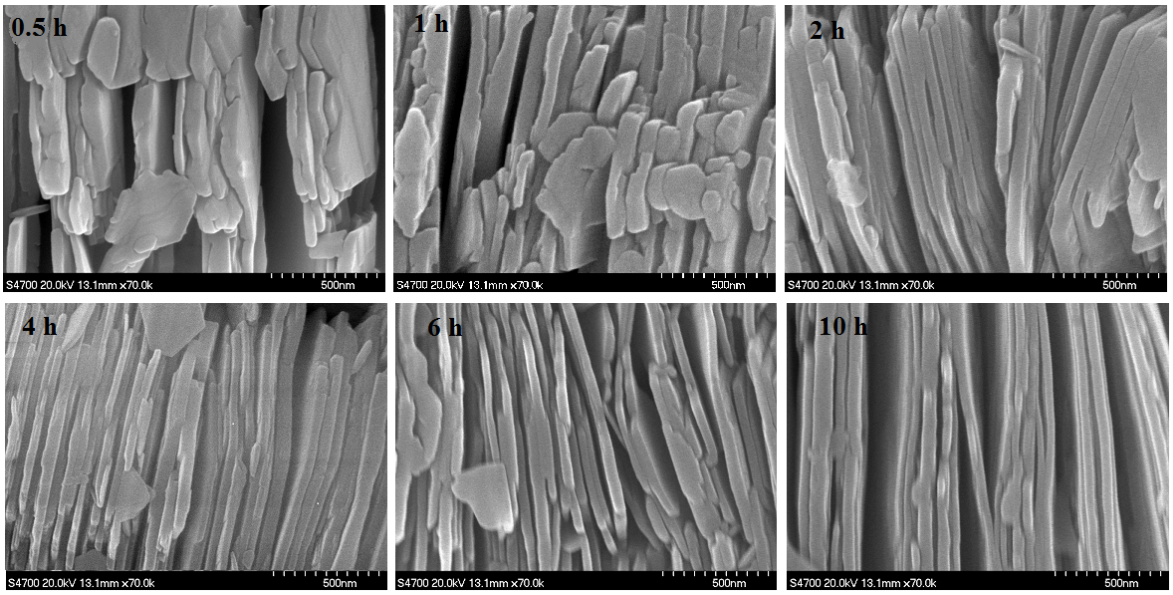

Fig.S10 SEM images of sepiolite with different acidification time. Conditions: the reaction temperature was 100 °C, the pH of sepiolite was 1.0, the concentration of sepiolite was 10 $mg \cdot mL^{-1}$.