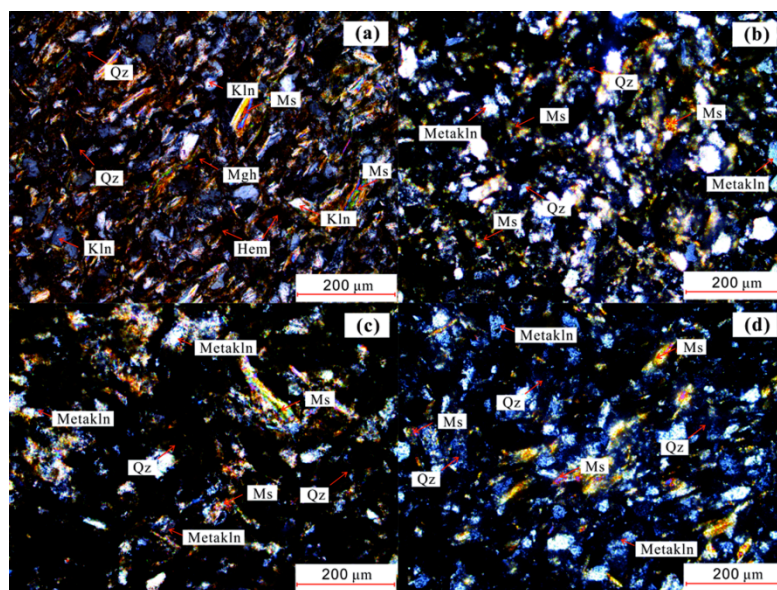
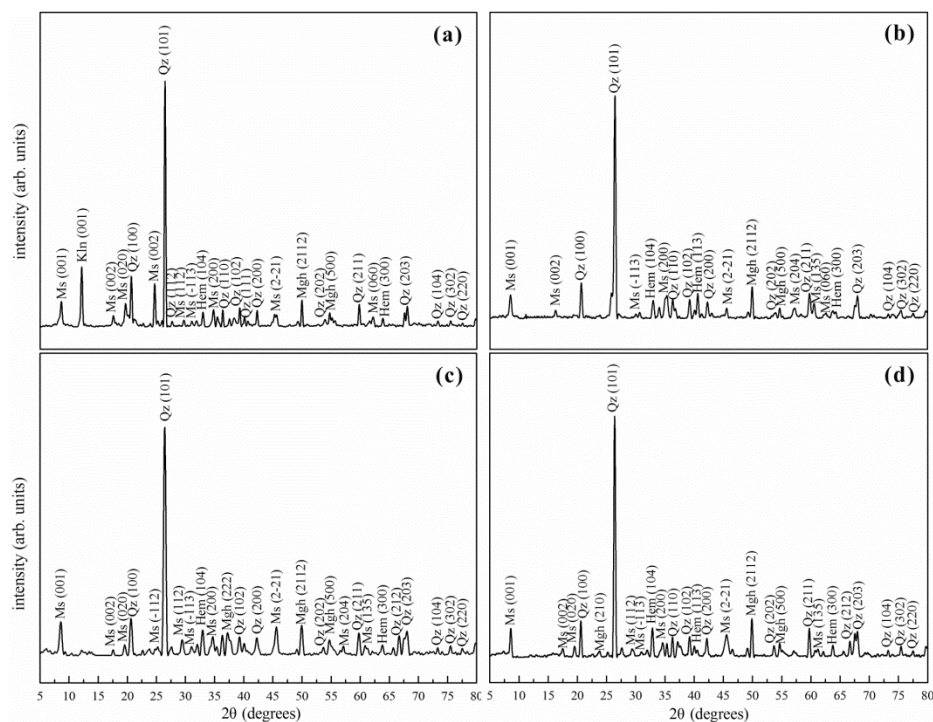


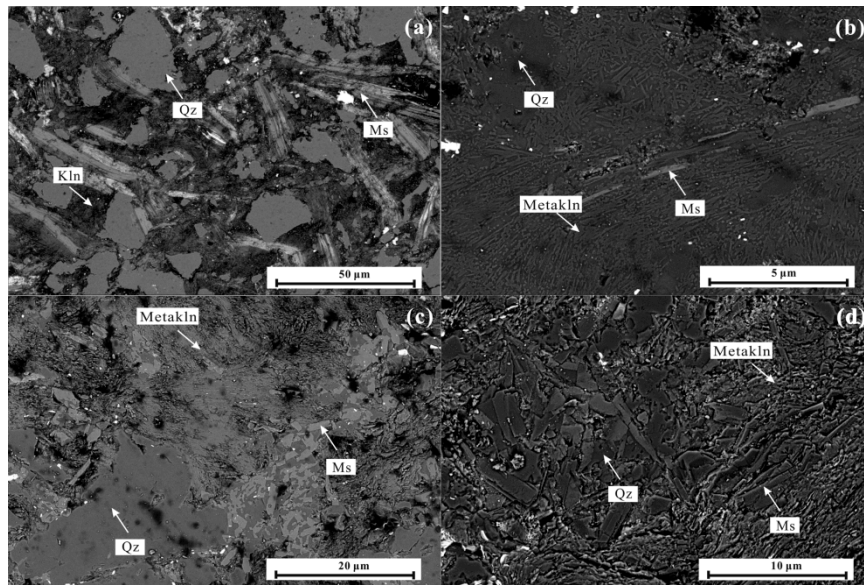
## The mineralogical assemblage of the mudstone samples determined by Photomicrographs, XRD patterns and BSE images



**Fig. S1** Photomicrographs of (a) the original mudstone sample and experimental products at (b) 0.5 GPa, (c) 1.5 GPa, and (d) 2.5 GPa. Kln = kaolinite, Ms = muscovite, Qz = quartz, Hem = hematite, and Mag = maghemite.



**Fig. S2** X-ray diffraction patterns of the original sample and experimental products: (a) original phyllite sample; and (b), (c), and (d) experimental products at 0.5, 1.5, and 2.5 GPa, respectively. Kln = kaolinite, Ms = muscovite, Qz = quartz, Hem = hematite, and Mag = maghemite.



**Fig. S3** Electron backscattered images of the (a) original mudstone sample and recovered samples after electrical conductivity measurements at (b) 0.5 GPa, (c) 1.5 GPa, and (d) 2.5 GPa. Kln = kaolinite, Ms = muscovite, and Qz = quartz.