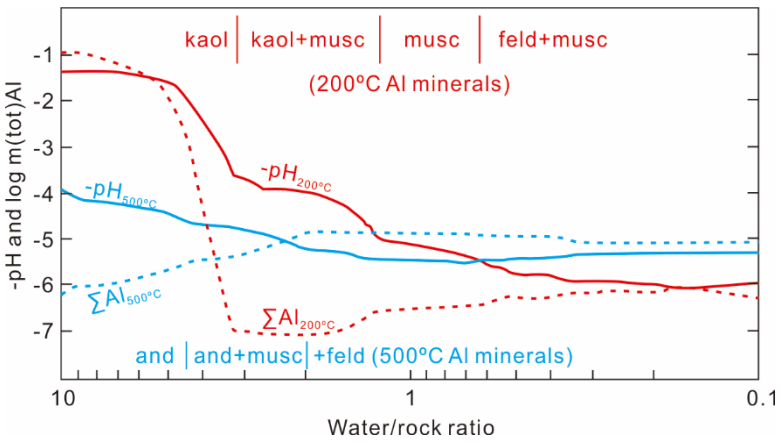

Figure S1. Calculated Al solubility and pH at 500 °C (blue line) and at 200 °C (red line) along with stable Al-bearing minerals, computed for reaction of granite with magmatic fluid. At 200°C, Al solubility dramatically increases at low pH and is otherwise very low at neutral pH (modified from Rusk et al (2008)). Abbreviations: tot-total; kaol-kaolinite; musc-muscovite; feld-feldspar.

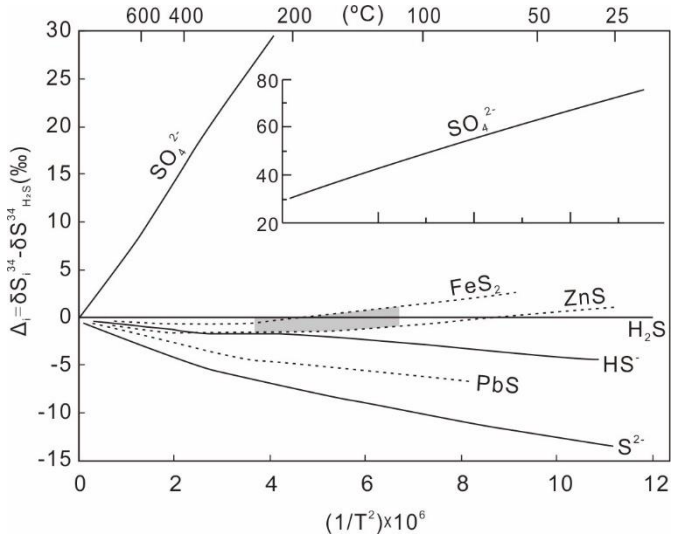

Figure S2. Equilibrium isotopic enrichment factors among important sulfur compounds relative to H_2S (based on data from Rye and Czamanske (1969); Sakai (1969) and Kajiwara and Krouse (1971)). Solid lines - experimentally determined, dashed lines - extrapolated or theoretically calculated. This figure demonstrates the negligible isotopic fractionation between sulfide and H_2S.

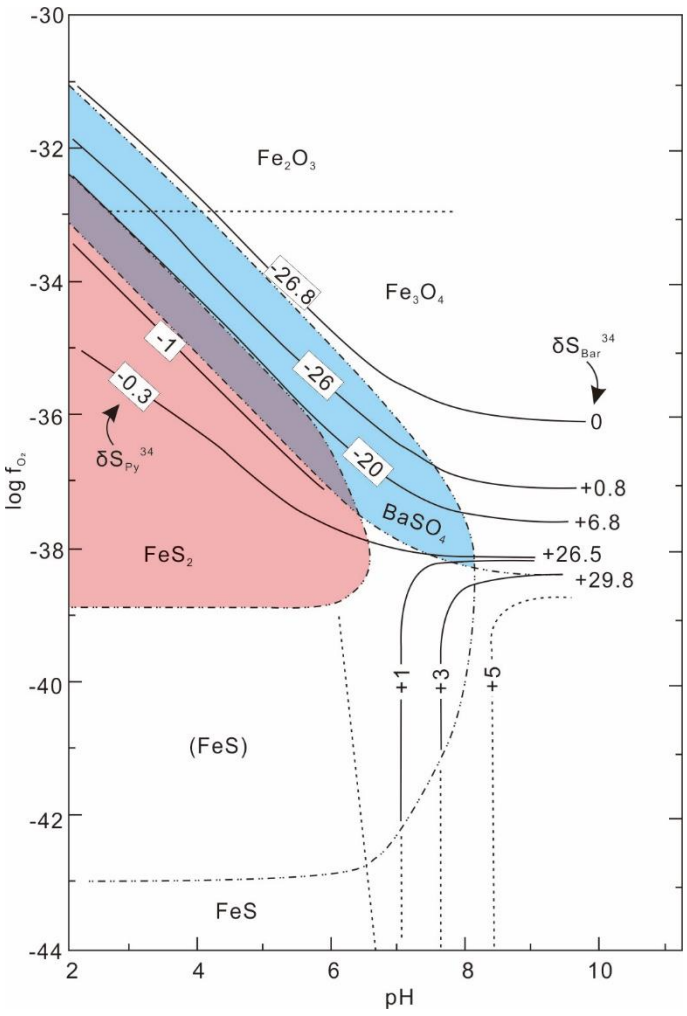

Figure S3. Comparison of the positions of S contours with stability fields of Fe-S-O minerals and barite, showing influence of fO_2 and pH on the isotopic compositions of sulfur species. (theorical conditions and parameters are described in Ohmoto (1972)). Values on $\delta^{34}S$ contours are for H_2S at $\delta^{34}S_{\Sigma}$ = 0‰. The plot shows a limited range of $\delta^{34}S_{H2S}$ in the area outside the intersection of the range of pyrite and barite fields. This suggests that fO_2 and pH cannot strongly control the wide range of H_2S observed in the Wusihe deposit, where barite is rare.

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