

**Supplementary material**

**Supplementary material 1.** Original sulfur isotopic composition of NJUMc-1 marcasite determined using LA-MC-ICP-MS and SIMS. The results of the standards used in this study (UWPy-1, PPP-1 and Py-1) are also included.

**Supplementary material 2.** Crystal orientation of the two sets of selected marcasite grains.