

gen isotope fractionations between hematite and water derived from the hydrolysis-forced and transformation approaches fit two different steady-state fractionation relationships, respectively, with the former being enriched about 2‰ in ^{18}O relative to the latter:

Hydrolysis-forced approach: $10^3 \ln \alpha = 1.17 \pm 0.02 \times 10^6/T^2 - 9.14 \pm 0.20$

Solution-transformation approach: $10^3 \ln \alpha = 1.46 \pm 0.18 \times 10^6/T^2 - 14.52 \pm 0.03$

At 315°C, however, the fractionations between hematite and water measured by the two different approaches are not only in agreement with each other within the analytical errors, but also close to the theoretical predictions by the increment method. This suggests that the measured fractionations represent the equilibrium ones for the hematite-water system at this temperature. The different fractionation relationships were obtained from the two different types of synthetic experiments at 90 to 225°C, indicating that the measured fractionations depend not only on the formation temperatures of hematite, but also on the formation mechanism of hematite. This corresponds to the kinetically controlled, steady-state fractionations of oxygen isotopes between hematite and water at the low temperatures. This may be of great importance to geochemical interpretation of oxygen isotope data for hematite formed in low temperature environments.

Key words: hematite; chemical synthesis; oxygen isotopes; fractionation factor; steady-state equilibrium

铜多金属矿田区域地球化学异常结构模式

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本文从大中型铜多金属矿(田)的多元素地球化学异常特征出发,初步地、系统地论述了矿田地球化学异常的含义和范围、多元素区域异常组合的划分,以及矿田区域地球化学异常模式等问题。提出了矿田区域地球化学异常结构模

式,阐述了矿田区域地质地球化学异常结构模式的研究对象和主要内容,总结出矿田区域地球化学异常结构的三种表现形式。并指出了矿田区域地球化学异常结构模式在区域成矿预测评价中可能起的作用。

广东长坑大型金银矿矿石矿物流体包裹体中有机气体组成及其对矿床成因的制约

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新发现的长坑金银矿床是一个新型沉积岩赋矿型贵金属矿床。大部分研究者认为其成因为大气降水对流。超高真空四极气相质谱系统分析显示该矿矿石矿物流体包裹体中存在9种轻烃有机气体,它们主要由 C_{1-4} 饱和烷烃和 C_{2-4} 不饱和烯烃和芳烃组成,但烷烃占绝对优势,而烯烃和芳烃含量很低,大部分样品 $\sum \text{alka} / \sum \text{alke} > 100$,说明这些有机气体主要来自中低温条件下水-岩反应所导致的沉积岩中有机质的热分解,成矿过程基本未受到岩浆作用的影响。研究表明这些轻烃气已达到化学平衡,它们可能源于沉积盆地(如三

洲盆地)深部干酪根的热解,并经过成矿流体长距离搬运到达目前较浅的成矿部位。大部分轻烃气体来自沉积岩围岩中Ⅱ类干酪根(库克油页岩)热解,少量来自微生物分解。金矿和银矿矿石矿物样品中轻烃有机气体的组成和各种参数相当一致,显示两者的成矿过程可能相似。从有机气体组成看,该矿成矿时大地构造背景可能为裂谷环境。本文的研究从一个侧面支持了作者等提出的长坑金银矿不是大气降水对流型矿床,而可能属沉积热卤水改造型矿床、其成因与沉积盆地演化有关的观点。