

REE Geochemistry of Lamprophyres in the Laowangzhai Gold Orefield, Yunnan Province

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Lamprophyres, which are widely distributed in the Laowangzhai gold orefield, Yunnan Province, and closely related to gold mineralization in time and space, can be divided into the kinds including the fresh (weakly altered), the altered and the mineralized. The kinds of lamprophyres in the orefield are similar in the range of RE contents and the RE patterns, but definitely different in the parameters of LRE/HRE, $N_{La/Yb}$ etc. The features of RE geochemistry of fresh lamprophyres show that rocks were the products with different degrees of partial melting of enriched mantle. The calculated results of REE activity regularity in the process of alteration and mineralization of lamprophyres in the orefield show that the altered fluids and mineralized fluids contain RE, and these fluids mainly are the products of mantle degassing and magma degassing during lamprophyric magmatism.

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金属性 Zintl 相化合物 $RE_3Cu_3Sb_4$ (RE=Nd, Sm, Tb, Dy, Ho) 的合成、结构及成键特性

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用电弧熔炼方法合成了化合物 $RE_3Cu_3Sb_4$ (RE=Nd, Sm, Tb, Dy, Ho), 采用粉末 X 射线衍射方法测定了其晶体结构。化合物属立方晶系, $Y_3Au_3Sb_4$ 类型, 空间群 $I-43d$ (No. 220), 皮尔森玛 $cI40$ 。晶胞参数: $Nd_3Cu_3Sb_4$: $a=0.96749(1)$ nm, $V=0.90561(3)$ nm³; $Sm_3Cu_3Sb_4$: $a=0.96145(1)$ nm, $V=0.88875(3)$ nm³; $Tb_3Cu_3Sb_4$: $a=0.95362(1)$ nm, $V=0.86721(3)$ nm³; $Dy_3Cu_3Sb_4$: $a=0.95088(1)$ nm, $V=0.85975(3)$ nm³; $Ho_3Cu_3Sb_4$: $a=0.9488(2)$ nm, $V=0.8541(5)$ nm³。每个单胞中包含 4 个化合式量。此结构中, Cu 原子均处于 Sb 原子所形成的配位四面体中心, 这些共价结合的配位四面体通过共顶最终联接形成三维 Cu-Sb 网络, 稀土原子则散布在网络之间的空隙中。化合物电荷平衡结构式可表示为 $RE_3^{3+}Cu_3^{1+}Sb_4^{3-}$, 化合物具有导电性, 为金属性 Zintl 相。原子成键具有典型过渡性。原子的“配位数”遵从配位环境规律。化合物的晶胞参数遵循正常的镧系收缩规律。

关键词: 稀土, 金属间化合物, 金属性 Zintl 相, 钨化物, 晶体结构, 过渡成键

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