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Based on the extraction equilibrium and mass balance in countercurrent extraction systems，a novel method for dealing with the extraction equilibrium and the mass distribution in the multi-component(λ-component) system was proposed. The 2λ dimensions simultaneous equations were obtained to express the relationships of mass distribution(x_i, y_i; $i=1$, …, λ) between two phases. This simultaneous equations can be converted to a one-dimension nonlinear equation which can be solved by Newton-Raphson algorithm within a few interactions. Compared with the normal calculation for the 2λ dimensions simultaneous equations， Newton-Raphson algorithm can decrease the iteration times， increase the convergence of the equations and accelerate the speed of simulation. It was demonstrated with satisfactory results in many multi-component systems. As an example， a five-component system was shown in this paper.
Keywords: Rare earths, Multi-component system, Extraction equilibrium Newton-Raphson algorithm

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稀土化合物 RE(HCO₂)₃(HNO₂)的合成与表征

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合成了系列新化合物 RE(HCO₂)₃(HNO₂)(H₂CO₂)(RE＝ Y，Tb，Dy，Ho，Er，Yb，Tm)，用 X 射线方法表征了其结构。单晶结构分析表明此新类型的结构为正交晶系且具有非中心对称空间群(20)$C222_1$，晶体结构为三维网络结构，结构的基本单元为以稀土原子为中心的八个配位氧原子所形成的反四方柱，这些单元通过碳或氮原子桥联而形成网络结构，而客体甲酸分子 H₂CO₂ 则分布于沿晶体学 *a* 方向的隧道中。化合物的磁性测量表明，重稀土化合物磁化率随温度的变化遵循 Curies-Weiss 定律，并且计算所得有效玻耳磁子数与相应的三价稀土离子理论值相符；钇化合物则表现出很弱的与温度无关的顺磁性。与其他稀土甲酸盐类比较，此系列化合物可能具有非线性光学性质。
关键词：稀土，甲酸盐，磁性，非线性光学材料