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配合物生成反应速率常数与平衡常数之间的直线自由能关系**IV:5**位取代**-1,10-**邻菲 啉**-**铜**(II)**与镍**(II)**的金属交换反应动力学和机理研究

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摘要

关键词 反应机理 铜络合物 平衡常数 交换反应 镍络合物 反应速度常数 二氮杂菲 线性自由能关系

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Linear free energy relationships between reaction rate constants and equilibrium constants of complex compounds IV: Kinetic study of metal-exchange reactions between (5-R-1,10-phenanthroline) copper (II) and nickel(II)

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Abstract The kinetics of the metal exchange reactions between (5-R-phen)copper(II) (R = Me, H, Cl, and NO2) and Ni (II) was studied at 25?and ionic strength 1.0 mol dm-3 or pH 2.3-3.5. The rate of the exchange reactions was measured by a spectrophotometer. The reactions appeared to proceed through 3 different pathways which involved H+ attack and Ni attack as well as a pH- and Ni-independent dissociation of the complexes. The kinetics conforms to the following rate law: d[Ni(5-R-phen)]/dt = (kp + kH[H+] + kNi[Ni2+])[(Cu(5-R-phen)2+]. The reaction rate of the 3 pathways increased with decreasing basicity of the ligand. Some linear free energy relationships were found to exist between the reactivity of these Cu(II) complexes and the base strength of the ligand 5-R-phen. The mechanisms of the reactions are discussed.

Key words REACTION MECHANISM COPPER COMPLEX EQUILIBRIUM CONSTANT EXCHANGE REACTION NICKEL COMPLEX REACTION RATE CONSTANT PHENANTHROLINE LINEAR FREE ENERGY RELATIONSHIP

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