

## 铜(II)与 $\alpha$ , $\beta$ -不饱和酸根形成的超分子配合物的合成、磁性及晶体结构

王尧宇,高忆慈,时茜,史启祯

兰州大学化学系,兰州(730000);西北大学化学系,西安(710069)

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**摘要** 合成了铜(II)与丙烯酸根和铜(II)与 $\alpha$ -甲基丙烯酸根形成的两种超分子配合物,进行了元素分析、红外光谱、ESR谱和磁性等研究,确定分子单元的组成为 $\text{Cu} \sim 2\text{A} \sim 4(\text{H} \sim 2\text{O}) \sim 2$ ,其中 $\text{A} = \text{CH} \sim 2 = \text{CH} \sim \text{COO}^-$ ,  $\text{CH} \sim 2 = \text{C}(\text{CH} \sim 3) \sim \text{COO}^-$ 。测定了铜(II)与丙烯酸根形成的配合物的晶体结构。晶体属单斜晶系;C2/c群;晶胞参数: $a = 1.7009(9)\text{nm}$ ,  $b = 0.8060(5)\text{nm}$ ,  $c = 1.4429(4)\text{nm}$ ,  $\beta = 109.31(5)^\circ$ ,  $Z = 4$ ;最终偏离因子 $R = 0.0501$ 。Cu(II)具有畸变的四角锥形配位环境,两个Cu(II)由四个丙烯酸根桥联,在Cu(II)的端位各有一个 $\text{H} \sim 2\text{O}$ 分子配位。Cu(II)-Cu(II)间具有一对称中心,Cu-Cu间距离为 $0.26096(14)\text{nm}$ ,两个Cu(II)间具有反铁磁性偶合作用。每个分子单元以四根氢键与相邻的两个分子单元相连接,沿c轴形成一维链状超分子配合物。

**关键词** [铜络合物](#) [晶体结构](#) [磁性](#) [丙烯酸P](#) [甲基丙烯酸P](#) [元素分析](#) [红外分光光度法](#) [电子自旋共振](#)

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## Syntheses, magnetic properties and crystal structure of supramolecular copper(II) complexes with $\alpha$ , $\beta$ -unsaturated carboxylates

Wang Yaoyu, Gao Yici, Shi Qian, Shi Qizhen

Lanzhou Univ, Dept Chem. Lanzhou(730000); Northwest Univ, Dept Chem. Xian(710069)

**Abstract** Two supramolecular complexes  $\text{Cu} \sim 2\text{A} \sim 4(\text{H} \sim 2\text{O}) \sim 2$  [ $\text{A} = \text{CH} \sim 2 = \text{CH} \sim \text{COO}^-$  and  $\text{CH} \sim 2 = \text{C}(\text{CH} \sim 3) \sim \text{COO}^-$ ] have been synthesized, and characterized by elemental analyses, IR, ESR and magnetic studies. The single crystal X-ray diffraction shows that  $\text{Cu} \sim 2(\text{CH} \sim 2 = \text{CH} \sim \text{COO}) \sim 4(\text{H} \sim 2\text{O}) \sim 2$  crystallizes in the monoclinic space group C2/c, with  $a = 1.7009(9)\text{nm}$ ,  $b = 0.8060(5)\text{nm}$ ,  $c = 1.4429(4)\text{nm}$ ,  $\beta = 109.31(5)^\circ$ ,  $Z = 4$  and  $R = 0.0501$ . Two copper(II) atoms are bridged by four acrylate groups. Each copper(II) atom is coordinated with  $\text{H} \sim 2\text{O}$  molecule in axial position, forming a distorted square pyramidal configuration. The symmetric center is between the two copper(II) atoms. The Cu-Cu bond distance is  $0.26096(14)\text{nm}$ . The Cu-Cu distance and magnetic studies suggest that there exists an antiferromagnetic interaction between the two copper(II) atoms. Two adjacent molecular units are linked by two hydrogen bonds ( $\text{O} \dots \text{O} = 0.2833\text{nm}$ ), forming a one-dimensional chain supramolecular complex along c axis.

**Key words** [COPPER COMPLEX](#) [CRYSTAL STRUCTURE](#) [MAGNETISM](#) [ACRYLIC ACID P](#) [METHYLPROPENOIC ACID P](#) [ELEMENTAL ANALYSIS](#) [INFRARED SPECTROPHOTOMETRY](#) [ELECTRON SPIN RESONANCE](#)

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