

Single crystal electron paramagnetic resonance spectra of CuII ions in Cu(tyrosine)2: A study of weak exchange interactions mediated by resonance assisted hydrogen bonds (RAHB)

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EPR measurements have been performed on single crystals of [Cu(L-tyrosine)₂]az at 33.8 GHz and at room temperature. The EPR spectra display partially resolved EPR lines for most orientations of the magnetic field in the ab plane, and only one resonance for orientations close to the crystal axes, while only a single line is observed along any direction in the ca and cb crystal planes. This behavior is a result of the selective collapse of the resonances corresponding to the four copper sites in the unit cell produced by the exchange interactions between the copper ions. The magnitudes of the exchange interactions between the copper ions were evaluated from the angular variation of the line width and the collapse of the EPR lines. The value $|J_{AD}/k_B| = 0.8$ K between neighboring copper atoms at 4.942 Å is assigned to a syn-anti equatorial-apical carboxylate bridge with a total bond length of 6.822 Å, while the small value $|J_{AB}/k_B| = 0.004$ K is assigned to a long bridge of 11 atoms with a