EPR Spectra of Some Cu$^{2+}$-Doped Metal Carbonates and Disorder Phase Transition in K$_3$H(CO$_3$)$_2$

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Cu$^{2+}$-doped K$_3$H(CO$_3$)$_2$, Rb$_2$CO$_3$, and Rb$_2$KH(CO$_3$)$_2$ single crystals were investigated by electron paramagnetic resonance (EPR) spectroscopy. The EPR spectrum of K$_3$H(CO$_3$)$_2$ indicates two different sites for Cu$^{2+}$ at room and at low temperatures. But the signals for the two sites overlap at 318 K which is attributed to a disorder phase transition. Each of the other compounds exhibits one site. The Cu$^{2+}$ ion seems to substitute the K$^+$ and Rb$^+$ ions and the charge compensations are fulfilled by the proton vacancies in K$_3$H(CO$_3$)$_2$, and another K$^+$ and Rb$^+$ in the other compounds. The spin Hamiltonian parameters $g$ and $A$ for each compound are determined and discussed.

Key words: Electron Paramagnetic Resonance; Carbonates; Disorder Phase Transition; Cu$^{2+}$ Doping.