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Mössbauer and SQUID Study of $Fe_{0.3}Cu_{0.7}Rh_2Se_4$

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Antiferromagnetic $Fe_{0.3}Cu_{0.7}Rh_2Se_4$ has been studied over a temperature range from 4.2 to 300 K using the Mössbauer and SQUID (superconducting quantum interference device) techniques. X-ray diffraction shows that it has a cubic spinel structure and lattice constant of $a_o = 10.271 \pm 0.0005$ Å. The isomer shift indicates that the valence state of the Fe ions are ferric. Absence of quadrupole splitting suggests that iron ions occupy only the tetrahedral sites. Its Néel temperature is found to be 32 ± 1 K. Magnetic susceptibility measurements be dc SQUID magnetometry show that long-range superexchange interactions on the tetrahedral sites are antiferromagentic.