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Coexistence of Superconductivity and Magnetic Order in $RuGd_2Sr(Cu_{1-x}Fe_x)_2O_8$ probed by ^{99}Ru and ^{57}Fe Mössbauer Effects[1] D. COFFEY, Dept. of Physics, Buffalo State College, NY, G. LONG, Dept. of Physics, SUNY Buffalo, M. DEMARCO, Dept. of Physics, Buffalo State College, NY, M. S. TORIKACHVILI, Dept. of Physics, San Diego State University — $RuGd_2Sr_2Cu_2O_8$ develops magnetic order at about 137K and becomes a superconductor at lower temperatures($T_{SC} \sim 40$K). T_{SC} decreases with increasing Fe doping in $RuGd_2Sr_2(Cu_{1-x}Fe_x)_2O_8$ and is zero by $x = .03$. We measure the ^{99}Ru and ^{57}Fe Mössbauer Effects for x=0, 0.1, 0.2, and 0.3. The ^{57}Fe Mössbauer spectra(MS) show that there are two different Fe sites at 4.2K with very similar hyperfine magnetic fields, $H_{hyper} \sim 48$ T. However H_{hyper} goes to zero at ∼half the Fe sites in a temperature range between 30K and 40K in superconducting and non-superconducting samples. There is no significant change in H_{hyper} in the ^{99}Ru MS in this temperature range. We conclude that the Fe sites whose H_{hyper} does not change are in the magnetically ordered RuO planes. We assume that the Fe's which see the transition between 30K and 40K are in the CuO planes and investigate how this transition arises.

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