Evolution of magnetism in $UCo_{1-x}Ru_xGe$

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UCoGe is an archetype of 5f-electron ferromagnet (T_C∼3K) which becomes superconducting (T_{SC}∼0.6K) at ambient pressure. The low values of T_C and the spontaneous magnetic moment ($0.03\mu_B$/f.u.) indicate nearness of a ferromagnetic instability. We prepared a series of $UCo_{1-x}Ru_xGe$ polycrystals and studied development of magnetism. We observed that the Ru doping leads at first to a sharp increase of the T_C up to 8.5K for x=0.12 and simultaneous suppression of SC. Further doping decreases T_C towards the QCP at x≈0.3. We have grown two single crystals - $UCo_{0.88}Ru_{0.12}Ge$ and $UCo_{0.97}Ru_{0.03}Ge$. They exhibit strong magnetocrystalline anisotropy similar to UCoGe but the spontaneous magnetization is higher. These single crystals were studied by PND. In contrast to the antiparallel orientation of the Co and U moments in UCoGe we observed parallel orientation in $UCo_{0.88}Ru_{0.12}Ge$ and $UCo_{0.97}Ru_{0.03}Ge$. Our findings are confronted with theoretical calculations using CPA.