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Antiferromagnetic Kondo lattice in the layered compounds $Re_2NiGa_9Ge_2$ (Re=Ce, Pr, Sm) YANGLIN ZHU, JINYU LIU, JIN HU, Department of Physics and Engineering Physics, Tulane University, New Orleans, LA 70018, DANIEL ADAMS, LEONARD SPINU, Department of Physics and AMRI, University of New Orleans, New Orleans, LA 70148, ZHIQIANG MAO, Department of Physics and Engineering Physics, Tulane University, New Orleans, LA 70018. — Intermetallic compounds containing rare-earth/actinide elements with 4f/5f electrons have formed a special family of strongly correlated materials, i.e. heavy fermion systems. We have recently found a new layered rare earth intermetallic system showing moderate heavy fermion behavior: $Re_2NiGa_9Ge_2$ (Re=Ce, Sm, Pr). The Re=Ce and Sm members were previously synthesized [1], while their electronic properties have not been reported. We have recently grown single crystals of $Re_2NiGa_9Ge_2$ (Re=Ce, Sm, Pr) and characterized their electronic and magnetic properties. We find all these materials are antiferromagnetic, with T_N =2.5 K, 5 K, 3.4 K respectively for Re=Ce, Pr and Sm. Moreover, they also exhibit large values of electronic specific coefficient: $\gamma \approx$101 mJ mol-Ce^{-1} K^{-2} for Re=Ce, 368 mJ mol-Pr^{-1} K^{-2} for Re=Pr, and 196.4 mJ mol-Sm^{-1} K^{-2} for Re=Sm, indicating enhanced Kondo effect and the presence of AFM Kondo lattice. Our findings suggest that $Re_2NiGa_9Ge_2$ (Re=Ce, Pr, Sm) could be interesting candidate materials for exploring novel exotic properties of correlated electrons through external parameter tuning such as chemical substitution and pressure. Reference: [1] M. A. Zhuravleva and M. G. Kanatzidis, Inorg. Chem. 2008, 47 (20), 9471-9477.

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