Crystal structure and physical properties of Ce$_3$T$_2$M$_7$ (T = Fe, Co, Ni, Zn and M = Ge, Sn) ternary compounds

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Polycrystalline samples of novel ternary compounds Ce$_3$T$_2$M$_7$ (T =Fe, Co, Ni, Zn and M = Ge, Sn) were prepared by means of conventional arc melting the stoichiometric amounts of the elements and studied by means of X-ray powder diffraction and magnetization measurements performed in wide temperature and magnetic field ranges. Rietveld refinement revealed that all the phases studied crystallize in the orthorhombic La$_3$Co$_2$Sn$_7$-type structure (space group $Cmmm$, no. 65). The magnetization data analysis showed that at high temperatures the compounds Ce$_3$Co$_2$Ge$_7$, Ce$_3$Co$_2$Sn$_7$, Ce$_3$Fe$_2$Ge$_7$, Ce$_3$Ni$_2$Sn$_7$ and Ce$_3$Ni$_2$Ge$_7$ exhibit Curie-Weiss-like paramagnetism of nearly localized cerium magnetic moments. In Ce$_3$Co$_2$Sn$_7$, Ce$_3$Ni$_2$Sn$_7$ and Ce$_3$Ni$_2$Ge$_7$ the moments order antiferromagnetically below $T_N = 4.4$, 4.0 and 7 K, respectively, while a ferromagnetic-like features are observed in Ce$_3$Co$_2$Ge$_7$ below 7 K and in Ce$_3$Fe$_2$Ge$_7$ at about 8 K. The preliminary magnetic properties studies will be supplemented at the conference by the results of on-going electrical resistivity and specific heat measurements.