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Magnetic structure of R_2CoGa_8 (R = Gd, Tb and Dy) and evolution of the magnetic structures along the series of intermetallic compounds with R = Gd - Tm CARLOS GILES, JOSE RENATO MADERGAN, Argonne National Laboratory, CRIS ADRIANO, University of Illinois at Chicago, RAFAEL VESCOVI, PASCOAL PAGLIUSO, University of Campinas — In this work we have determined the magnetic structure of R_2CoGa_8 (R = Gd, Tb and Dy) intermetallic compounds using X-ray resonant magnetic scattering in order to study the evolution of the anisotropic magnetic properties along the series for R = Gd-Tm. The three compounds have a commensurate antiferromagnetic structure with a magnetic propagation vector (1/2 1/2 1/2) with Néel temperatures of 21.0, 27.5 and 15.2 K for R = Gd, Tb and Dy, respectively. The critical exponent β obtained from the temperature dependence of the integrated intensity of the resonant magnetic peaks suggest a 3D magnetism for the three compounds. The energy line shapes at the L_2 and L_3 edges of the magnetic peaks for these compounds present a purely dipolar character as demonstrated by comparison to first principle calculations. Comparing the simulated and integrated intensities corrected for absorption, we conclude that the magnetic moment direction is in the ab-plane for Gd_2CoGa_8 compound and parallel to the $c-$axis for the Tb_2CoGa_8 and Dy_2CoGa_8 compounds. This information is used to discuss the evolution of the magnetic structure of R_2CoGa_8 series for R = Gd-Tm where both the direction of the ordered moment and the ordering temperature evolution along the series can be explained through the competition between the indirect Ruderman-Kittel- Kasuya-Yoshida exchange interaction and crystalline electric field effects.

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