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# Mo<sub>2</sub>NiB<sub>2</sub>-type Sm<sub>2</sub>Co<sub>2</sub>Al and Sm<sub>2</sub>Co<sub>2</sub>Ga compounds: magnetic properties and giant low-temperature coercivity

A. V. Morozkin <sup>a\*</sup>, A.V. Garshev <sup>a,b</sup>, V.O. Yapaskurt <sup>c</sup>, Jinlei Yao <sup>d</sup>, R. Nirmala <sup>e</sup>, S. Quezado <sup>f</sup>, S.K.

Malik <sup>f</sup>

<sup>a</sup> Department of Chemistry, Moscow State University, Leninskie Gory, House 1, Building 3, Moscow, GSP-2, 119991, Russia

<sup>b</sup> Faculty of Materials Science, Moscow State University, Leninskie Gory, House 1, Building 73, Moscow, GSP-1, 119991, Russia

<sup>c</sup> Department of Petrology, Geological Faculty Moscow State University, Leninskie Gory, Moscow, 119992, Russia

<sup>d</sup> Jiangsu Key Laboratory of Micro and Nano Heat Fluid Flow Technology and Energy Application, School of Mathematics and Physics, Suzhou University of Science and Technology, Suzhou 215009, China

<sup>e</sup> Indian Institute of Technology Madras, Chennai 600 036, India

<sup>f</sup> Departamento de Física, Universidade Federal do Rio Grande do Norte, Natal, 59082-970, Brazil

\*Corresponding author: morozkin@tech.chem.msu.ru

## Abstract

The magnetic ordering of Mo<sub>2</sub>NiB<sub>2</sub>-type Sm<sub>2</sub>Co<sub>2</sub>Al and Sm<sub>2</sub>Co<sub>2</sub>Ga (*Immm*, No. 71, *oI10*) compounds has been established using bulk magnetic measurements. Polycrystalline Sm<sub>2</sub>Co<sub>2</sub>Al and Sm<sub>2</sub>Co<sub>2</sub>Ga undergo ferromagnetic transitions ( $T_C$ ) at 50 K and 62 K, respectively, and low-temperature field induced transitions ( $T_m$ ) around 14 K and 16 K (in a field of 10 kOe), respectively. Between  $T_C$  and  $T_m$  Sm<sub>2</sub>Co<sub>2</sub>Al and Sm<sub>2</sub>Co<sub>2</sub>Ga are soft ferromagnets. Below  $T_m$  Sm<sub>2</sub>Co<sub>2</sub>Al and Sm<sub>2</sub>Co<sub>2</sub>Ga exhibit permanent magnet properties with a residual magnetization per samarium of 0.38  $\mu_B$  and 0.36  $\mu_B$ , respectively, and a large coercive field of 69 kOe and 72 kOe, respectively, at 5 K.

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