

## **Evolution of structural and magnetic properties of Co-C granular alloys as a function of milling time.**

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The structure and magnetic properties were studied in nano scaled  $\text{Co}_x\text{C}_{1-x}$  ( $x = 0.01 - 0.05$ ) granular alloys. The structural evolution during mechanical alloying was examined by extended X-ray absorption fine structure (EXAFS) and X-ray diffraction (XRD) analysis. The magnetic properties also have been measured by vibrating sample magnetometer (VSM) in the temperature range from 300 K to 800 K. The structural analysis of EXAFS and XRD indicates that the increase of amorphous phase for carbon and of absence of long range order for cobalt. The grain size was estimated about 12 nm from the broadening of XRD peaks. The structural change gives rise to the variation of magnetic properties. With increasing milling time, the magnetization and Curie temperature were decreased with increasing the carbon content. The coercivity variation also was explained by the grain size reduction as increasing milling time. During mechanical alloying, the exchange interaction among the Co atoms becomes weaker due to inter-diffusion of Co and C atoms in all samples