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# Correlation between local structure and magnetic behavior in co-sputtered $\text{Tb}_x\text{Fe}_{73}\text{Ga}_{27-x}$ ( $7 \leq x \leq 11$ ) thin films

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We report on the evolution of the microstructure of Tb-Fe-Ga films deposited by co-sputtering from  $\text{Tb}_{33}\text{Fe}_{67}$  and  $\text{Fe}_{72}\text{Ga}_{28}$  targets. The sputtering power was fixed (90 W) in the  $\text{Fe}_{72}\text{Ga}_{28}$  whereas it was increased from 50 to 90 W in the  $\text{Tb}_{33}\text{Fe}_{67}$  target resulting on  $\text{Tb}_x\text{Fe}_{73}\text{Ga}_{27-x}$  layers with  $7 \leq x \leq 11$ . The local structure was determined by means of x-ray absorption fine structure spectroscopy at Fe-K, Ga-K and Tb-L<sub>3</sub> edges. The increase of Tb in the alloy promotes the phase segregation that produces a larger amount of the  $\text{TbFe}_2$  structural phase. The structural results have been correlated with the magnetic characterization that shows the enhancement of the out-of-plane component of the magnetization.

**Keywords:** sputtering; iron alloys; x-ray absorption fine structure; magnetic properties

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