

## 3D atom probe tomography of swift heavy ion irradiated multilayers

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Nanometer scale layered systems are well suited to investigate atomic transport processes induced by high-energy electronic excitations in materials, through the characterization of the interface transformation [1]. In this study, we used the atom probe technique to determine the distribution of the different elements in a (amorphous TbFe 5 nm/hcp-Co 3 nm)<sub>20</sub> multilayer before and after irradiation with 400 MeV Pb ions. Atom probe tomography is based on reconstruction of a small volume of a sharp tip evaporated by field effect. It has unique capabilities to characterize internal interfaces and layer chemistry with sub-nanometer scale resolution in three dimensions [2]. Depth composition profiles and 3D element mapping have been determined, evidencing for asymmetric interfaces in the as-deposited sample, and very efficient Fe-Co intermixing after irradiation at the fluence  $7 \times 10^{12}$  ion cm<sup>-2</sup>. The results are interpreted on the basis of the thermal spike model.

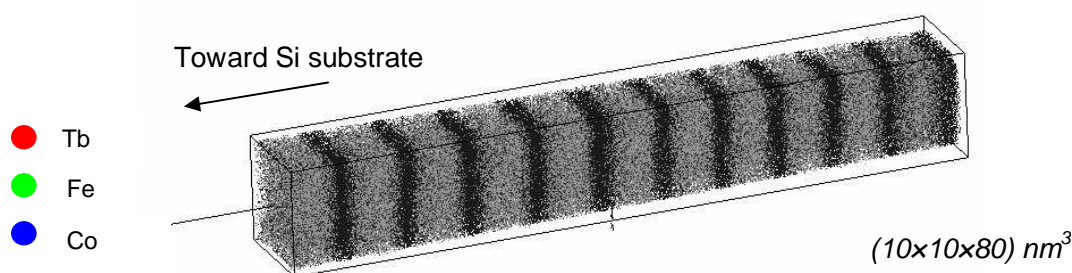


Figure 1: Tomographic atom probe reconstruction of a selected volume of the as-deposited TbFe/Co multilayer.

[1] R. Leguay, A. Dunlop, F. Dunstetter *et al.*, Nucl. Instr. and Meth. B 122 (1997) 481.

[2] A. Grenier, R. Lardé, E. Cadel, F. Vurpillot, J. Juraszek, J. Teillet and N. Tiercelin, J. Appl. Phys. **102** (2007) 033912.