

# Swift Iodine ion modification of the structural and magnetotransport properties of Fe/Cr systems

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Fe/Cr/Fe trilayers and (Fe/Cr)<sub>20</sub> multilayers prepared at ultrahigh vacuum conditions by thermal evaporation were irradiated with 200 MeV I<sup>13+</sup> ions in the fluence range between  $1 \times 10^{11}$ –  $8 \times 10^{12}$  ions/cm<sup>2</sup>. The structural properties of Fe/Cr/Fe trilayers and (Fe/Cr)<sub>20</sub> multilayers were measured by X ray reflectivity (XRR). Magnetic exchange coupling between Fe layers through the Cr spacer layer was observed by SQUID magnetization measurements. Magnetoresistance effect was measured using four probe method at room temperature.

XRR spectra showed an increase of interface roughness versus increasing irradiation fluence in multilayers, while in trilayers the interface roughness initially decreased then increased for the largest fluence. Before irradiation antiferromagnetic coupling fraction dominated in all samples. After irradiation the changes of magnetic coupling were different in both types of samples. Trilayers were less sensitive to irradiation fluence than multilayers but in each case no monotonic behavior was observed as a function of ion fluence. Vanishing of antiferromagnetic coupling, observed for the largest fluence, resulted in decrease of magnetoresistance effect in Fe/Cr multilayers.