Using a high intensity ion beam current tandem accelerator*, 3.66 MeV-Ni and -Al ions were implanted in Ni-Si alloys at 650 °C and α-Al₂O₃ at 1000 °C, respectively. The sample heating, to reach the corresponding experimental temperature, was achieved by a thermal resistance in the first case, whereas by radiation with a halogen lamp, in the second case. Such temperature was held constant within 10 °C as indicated throughout by a pyrometer focused (1 mm in diameter) at the middle of the irradiated area (6 mm in diameter). All experiments were carried out under a 10⁻⁷ mbar pressure, to avoid sample oxidation and ion beam scattering by air molecules.

SEM observation evidences surface nanofeatures induced by such irradiation. By Ni-Si alloys, long parallel channels are formed having a periodicity near to 1 µm and a mean depth of 0.5 µm (AFM measurements). By α-Al₂O₃ nanopyramids, around 50 nm basis and similar high, were detected on some grains forming periodic chains.

We assume that both induced surface features were produced by preferential sputtering. In the Ni-Si alloys, Si atoms are preferentially sputtered from Si-rich zones forming ribbon-like surface features, while in α-Al₂O₃, the sharp faceted pyramids and their periodic arrays, induce to think that a crystallographic preferential sputtering is taking place during irradiation.

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