Boriding of binary Ni-45.6 wt.% Ti shape memory alloys was carried out in a solid medium at 1273 K for 2, 4, 6 and 8 h using the powder pack method with proprietary Ekabor–Ni powders. Characterization of the boride layer formed on the surface of alloys was done by optical microscopy and scanning electron microscopy (SEM). The presence of boride, silicide and borosilicide phases in the boride layers was confirmed by X–ray diffraction (XRD) analysis. The thickness and microhardness of the boride layers increased with increasing boriding time. Hardness profiles showed a rapid decrease in hardness moving from the boride layer to the main structure. The high hardness of the boride layer was attributed mainly to the formation of TiB2. A parabolic relationship was observed between layer thickness and boriding time, and the growth rate constant for the boriding treatment was calculated as $0.62 \times 10^{-8}$ cm$^2$ s$^{-1}$.

**Keywords:** Boriding; Ni-Ti shape memory alloys; X–ray diffraction; Kinetics; Hardness testing.