Boriding of pure iron was investigated using the Q2 powder pack method with boriding powder mixtures containing different weight fractions of ZrB2 (5 %, 10 %, 15% and 20 %). The samples were borided in an electric resistance furnace for an exposure time of 4 h at 1,173 K temperature under atmospheric pressure. Borided samples were characterized by optical microscopy, X-ray diffraction analyses and microhardness tests. Results showed that the boride layers consisted mainly of FeB and Fe2B phases. No significant difference in boride layer thicknesses (average 140 µm) could be observed as a function of ZrB2 content. The needle-like morphology of the boride layer became more prominent with increasing weight fraction of ZrB2 in the boriding powders. The average microhardness of the boride layer decreased with increasing ZrB2 content due to changes in the morphology of the boride layer.

Keywords: boriding, boride layer, boriding agent, microhardness, ZrB2