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Measuring the destructive effects of gamma radiation on the physical properties of steel

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Abstract

In the present study, the most useful stainless steels in nuclear industry, i.e. 304, 304L and 316L, were provided and laser cut into the 0.5×0.5 cm dimension. Then the effects of radiation on the physical properties of the samples were investigated. Gamma irradiation on the samples was done with a ⁶⁰Co radioisotope to the doses of 100 and 200 kGy. The resistance of the samples was measured through the four-probe technique, also, the special resistance and the electrical conductivity of the samples were measured from resistance. The conductivity of the samples was obtained through Widman-Frantz. The magnetic properties of the samples were also measured by the vibrating sample magnetometer. Changes in the aforementioned properties before and after the irradiation were investigated in terms of thermal and time effects.

Keywords: stainless steel, four-probe, Widman-Frantz, vibrating sample magnetometer

For full article, refer to the Persian section