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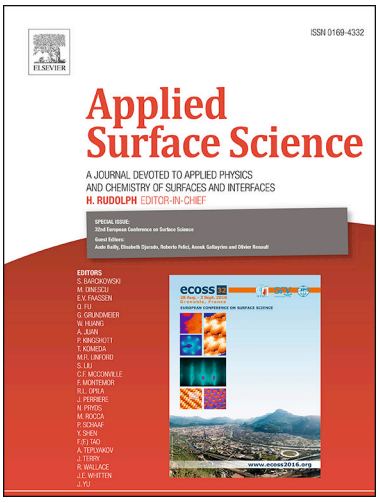

Full Length Article

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A novel crack healing in steels by gas nitrocarburizing

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Abstract

In this paper, the gas nitrocarburizing technique was applied for the first time to solve the challenge in crack healing of metallic materials. The crack-healing behavior of 42CrMo steel was investigated. The gas nitrocarburizing was carried out in two steps with the decrease of the healing temperature. The mechanical properties after healing were measured using the three-point blending test. X-ray diffraction, optical microscope and scanning electron microscopy were applied to characterize the phase composition and microstructure of crack healing area and analyze healing mechanisms involved. The results show that the optimal healing effect could be obtained when it is healed at 760 ℃ for 2h and then at 550 ℃ for 4h. The maximum healing degree reached to 63.68%. The crack healing process could be divided into