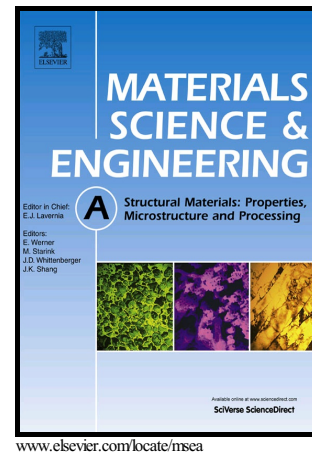


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Fracture properties of zinc coating layers in a galvanized steel and an electrolytically galvanized steel

Jinshan He^a, Junhe Lian^{a,*}, Anke Aretz^b, Napat Vajragupta^c, Ude Hangen^d, Frank Goodwin^e, Sebastian Münstermann^a

^aSteel Institute, RWTH Aachen University, 52072 Aachen, Germany

^bCentral Facility for Electron Microscopy, RWTH Aachen University, 52072 Aachen, Germany

^cInterdisciplinary Centre for Advanced Materials Simulation, Ruhr University Bochum, 44801 Bochum, Germany

^dBruker Nano GmbH, Dennewartstraße 25-27, 52068 Aachen, Germany

^eInternational Zinc Association, Durham, North Carolina 27713, United States

* Corresponding author. Tel.: +49-241-8025106; Fax: +49-241-8092253; E-mail address: Junhe.Lian@iehk.rwth-aachen.de

Abstract:

The zinc coating layer fracture properties of a galvanized steel and an electrolytically galvanized steel were analyzed by conducting the in-situ bending test with newly designed samples. It is found that the fracture develops much earlier in the coating layer of galvanized steel than that of electrolytically galvanized steel. Using transmission electron microscope and energy dispersive X-ray spectroscopy, the intermetallic phases are characterized and it is found that the early crack initiation in a galvanized steel is mainly triggered in the gamma phase. Combining with nano-indentation tests and corresponding simulation, the deformability of intermetallic phases were analyzed to explain the failure behavior of coating layers in the two steels.

Keywords: Zinc coating layer, fracture properties, galvanized steel, electrolytically galvanized steel

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