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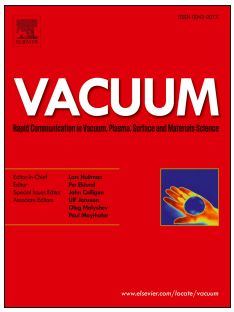

Design for strength-ductility synergy of 316L stainless steel with heterogeneous lamella structure through medium cold rolling and annealing

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Design for strength-ductility synergy of 316L stainless steel with heterogeneous lamella structure through medium cold rolling and annealing

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Abstract: Superior strength-ductility synergy of 316L stainless steel was achieved through medium cold rolling and subsequent annealing, which successfully fabricated heterogeneous lamella structure (HLS), reduced processing cost and improved preparation controllability. The HLS in 316L stainless steel processed by lower original rolling strain was more stable, and its microstructure was characterized with lamella recrystallized grain clusters and lamella coarse grains that were sandwiched by the mixtures of nano-sized twin bundles and ultrafine grains. The satisfactory strength-ductility synergy was mainly determined by the contents of various microstructures as well as the soft/hard interfaces in HLS. The high strength was obtained from hard ultrafine grains and nano-twin bundles. Meanwhile, the back stress induced by soft/hard interfaces also contributed to the high strength. For the favorable ductility, it was ascribed to the generation of plentiful forest dislocations in