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Effect of prior austenitic grain size on the tensile toughness of ultra-high strength steel weldments

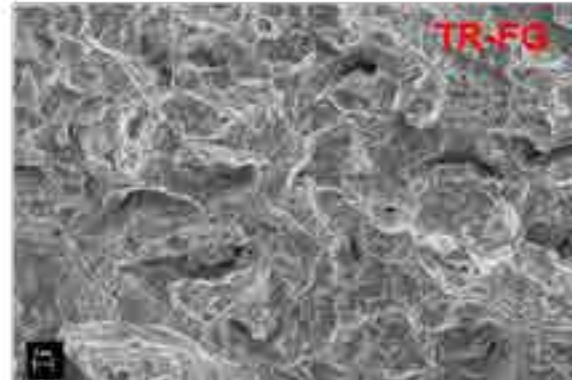
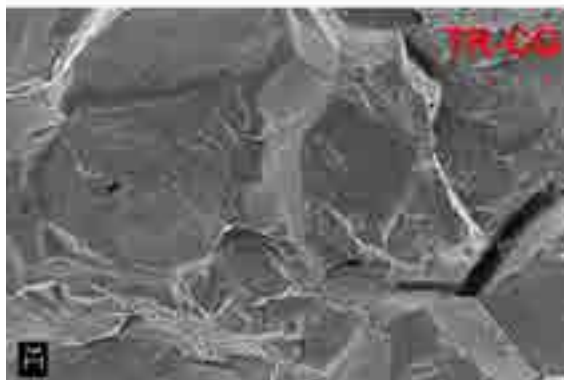
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This study focused on the effect of prior austenitic grain size on the microstructure and mechanical properties of ultra-high strength steel (UHSS) weldments. For this purpose, GPa-grade UHSS has produced by POSCO, and subsequently heat affected zone (HAZ) has simulated using the Gleeble thermo-mechanical simulator. To evaluate tensile toughness of the weldments, uniaxial sub-size tensile test was carried out and detailed microstructural analysis was conducted. As a result, martensitic matrix with high carbon equivalent in UHSS, which was formed

due to quenching during welding, was causative of brittle fracture behaviour in coarse-grained HAZ (CGHAZ). In contrast, it has been shown that fine-grain HAZ has ductile fracture behaviour. We, therefore, suggest the inverse relationship between the prior austenitic grain size and tensile toughness. The results were explained in terms of several microstructural terms such as alloying elements segregation to boundaries, retained austenite, and micro-hardness.



Biography

Gitae Park is pursuing third-year PhD in metallurgy and materials at Hanyang University, Republic of Korea. His research interests centers on the resistance spot welding of ultra-high strength steel. He has published 2 articles about welding metallurgy in a famous journal, *Materials Characterization*, Elsevier and the further research is being continued. He is also a member of the Korean Institute of Metals and Materials (KIM) and the Korean Welding and Joining Society (KWJS).

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