Sahoo, Sudeep K.; **Toth, Laszlo S.**; **Molinari, Alain**; **Latypov, Marat I.**; **Bouaziz, Olivier**
Plastic energy-based analytical approach to predict the mechanical response of two-phase materials with application to dual-phase steels. (English) Zbl 1479.74027
Eur. J. Mech., A, Solids 91, Article ID 104414, 15 p. (2022).

Summary: A composite made of two phases is considered with a perfect disorder of the phases, and isotropic behavior. The strain hardening behavior of such a composite is modeled under axisymmetric tension. The approach is based on using the strain hardening behavior of the two constituent phases together with a relation between the plastic energy of the two phases. The newly developed analytical model was applied to several dual-phase steel alloys and on iron-silver composite metal. These case studies revealed that the equal-power approach reproduces faithfully the strain hardening behavior of the composite, together with the strain partitioning between the two phases, in good agreement with experiments.

MSC:

74E30 Composite and mixture properties
74C99 Plastic materials, materials of stress-rate and internal-variable type
74S05 Finite element methods applied to problems in solid mechanics

Keywords:

homogenization; plastic energy; strain hardening; strain partition; composite model; dual-phase steel; finite element computation

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