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High temperature deformation behavior of carbon-containing FeCoCrNiMn high entropy alloy

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Abstract: High temperature compressive deformation behaviors of a carbon-containing FeCoCrNiMn high entropy alloy (HEA) was investigated at temperatures ranging from 700°C to 1000°C, and strain rates from 0.001s⁻¹ to 1s⁻¹. The microstructure mainly consists of fcc solid solution. The data obtained from the flow curves was employed to develop the constitutive equation, and the apparent activation energy (Q) was determined to be 385.43kJ mol⁻¹. The size of the dynamically recrystallized grains decreased with the increasing value of Zener-Hollomon (Z) parameter. At high Z condition, dislocation cross slip can act as the main deformation mechanism. At intermediate Z condition, dislocation cross slip accompanied by discontinuous dynamic recrystallization (dDRX) becomes the main deformation mechanisms. At low Z condition, continuous dynamic recrystallization (cDRX) becomes the dominant softening mechanism. Nano carbides can be precipitated at intermediate Z and low Z condition, which prevent grain from

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