

MICROSTRUCTURE EVOLUTION OF Cr₂AlC CERAMIC BEFORE AND AFTER OXIDATION INDUCED CRACK HEALING

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ABSTRACT

Ternary Cr₂AlC composites have good properties like other MAX phases, such as high temperature strength, oxidation and corrosion resistance, good electrical and thermal conductivity, and machinability. In present work, Cr₂AlC ceramic is produced by reactive hot-press sintering with the starting materials of chromium, aluminium and graphite powders. Crack damage was induced with a Knoop indenter in three point bending samples. The pre-cracked specimens were healed at 1100 °C in air for various times. XRD, SEM, TEM as well as SAD, EDS, HAADF techniques were used to characterize the phase constitution and microstructure evolution of Cr₂AlC ceramic before and after oxidation induced crack healing. The mechanism of atom diffusion and crack healing effect in Cr₂AlC will be uncovered through intensive study of the oxidation of aluminium and chromium.