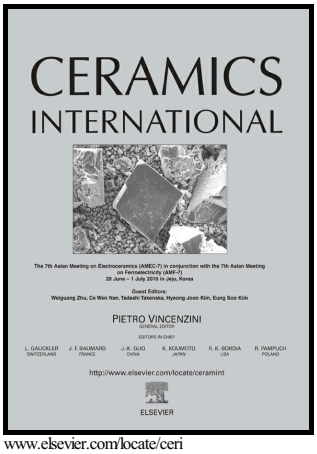

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YSZ/MoS_2 Self-Lubricating Coating Fabricated by Thermal Spraying and Hydrothermal Reaction

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Abstract

Thermal sprayed ceramic coatings have extensively been used in components to protect them against friction and wear. However, the poor lubricating ability severely limits their application. Herein, yttria-stabilized zirconia (YSZ)/MoS_2 composite coatings were successfully fabricated on steel substrate with the combination of thermal spraying technology and hydrothermal reaction. Results show that the synthetic MoS_2 powders are composed of numbers of ultra-thin sheets (about 7 ~ 8 nm), and the sheet has obvious lamellar structure. After vacuum impregnation and hydrothermal reaction, numbers of MoS_2 powders, look like flowers, generate inside the plasma sprayed YSZ coating. Moreover, the growing point of the MoS_2 flower is the intrinsic micro-pores of YSZ coating. The friction and wear tests under high vacuum environment indicate that the composite coating has an extremely long lifetime (> 100,000 cycles) and possesses a low friction coefficient less than 0.1,