Lanthanum zirconate based thermal barrier coatings: A review

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Lanthanum Zirconate Based Thermal Barrier Coatings: A Review

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Abstract

This review article summarizes the latest information about the manufacturing techniques of lanthanum zirconate ($La_2Zr_2O_7$, LZ) powder and $La_2Zr_2O_7$ based thermal barrier coatings (TBCs). Lanthanum zirconate is a promising candidate material for TBC applications, due to its lower thermal conductivity and higher thermal stability compared to other traditional TBC systems. In this work, the physical, thermal, and mechanical properties of the powder and coatings are evaluated. The durability experiments of the TBCs in various thermal, mechanical, and corrosive conditions is also reviewed. In addition, theoretical studies on the powder and coatings properties are presented. Finally, future research directions of lanthanum zirconate as TBC applications are proposed.

Keywords: Lanthanum zirconate; Thermal barrier coating; Properties; Durability; Modeling