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**Comparative thermal analysis of an advanced ceramic-coated piston in a spark ignition engine**

**ABSTRACT.** This study deals with the steady-state temperature variation in the partially ceramic-coated Al–Si piston of a petrol engine investigated using ANSYS Workbench finite-element modeling software. The ceramic material used for coating the piston crown was lanthanum cerate ( $\text{La}_2\text{Ce}_2\text{O}_7$ ). Coating width and thickness effects were explored and compared with an uncoated piston. Convection boundary conditions were considered. The coated surface temperature is greater than that of the uncoated piston and increases with increasing coating thickness, while normal stress decreased.

**Keywords:** ceramic coating, finite element modeling, internal combustion engine, lanthanum cerate, thermal barrier coating

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