

Corrosive Salt Vapour Deposition in Coal-Fired Gas Turbines

Gas turbines require clean fuels like natural gas but it would clearly be beneficial if 'dirty' fuels like coal could be used. Even after extensive clean-up, however, trace levels of alkali vapours can still deposit on the turbine blades as liquid or solid corrosive salts. Predicting the salt composition and its rate of deposition is a very difficult problem which involves a blend of chemical thermodynamics and kinetics, diffusion theory and boundary layer fluid mechanics. Methods of modelling the physical and chemical processes involved have been developed in collaboration with PowerGen (now e.on). Some early work has been published [1994] but much more has since been done in developing both a simplified physico-chemical analytical approach to provide understanding and approximate design data, and more elaborate computer codes for accurate predictions. This substantial body of work has yet to be published in the academic literature, although the report [2004] is in the public domain.

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Young JB, Wu Z. 2004. Particulate and vapour deposition in gas turbines fired on coal-derived gases. Final report *DTI Cleaner Coal R&D Programme. Project 142*.