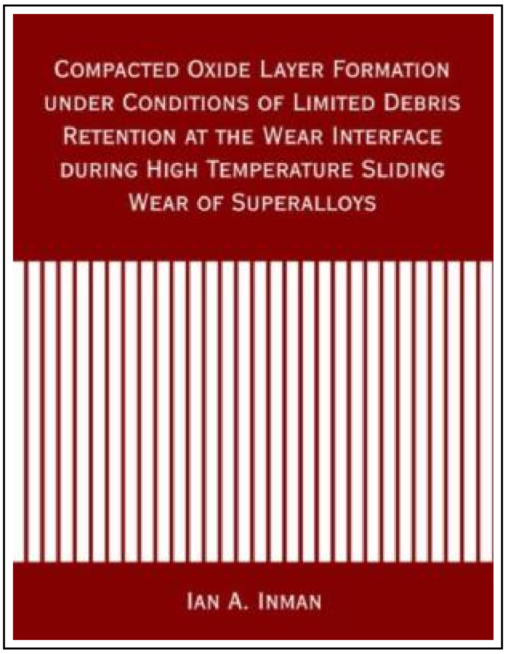
Compacted Oxide Layer Formation Under Conditions of Limited Debris Retention at the Wear Interface During High Temperature Sliding Wear of Superalloys (Paperback)



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Reviews

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COMPACTED OXIDE LAYER FORMATION UNDER CONDITIONS OF LIMITED DEBRIS RETENTION AT THE WEAR INTERFACE DURING HIGH TEMPERATURE SLIDING WEAR OF SUPERALLOYS (PAPERBACK)

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DISSERTATION.COM, United States, 2006. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****.For many applications, including power generation, aerospace and the automobile industry, high temperature wear provides serious difficulties where two or more surfaces move or slide relative to one another. In aerospace, for example, demands for more powerful, efficient engines operating at ever higher temperatures, mean that conventional lubrication is no longer sufficient to prevent direct contact between metallic sliding surfaces, accelerating wear. However, one high temperature phenomenon observed to reduce metallic contact, and thus wear and friction, is the formation of glazes , essentially compacted oxide wear debris layers that sinter together to form wear resistant surfaces. This thesis studies the nature of wear encountered with four different combinations of Superalloys, slid together using a block-on-cylinder configuration (Nimonic 80A and Incoloy MA956 as block / sample materials; Stellite 6 and Incoloy 800HT as cylinder / counterface materials) simulating car (automobile) engine valve-on-valve-seat wear. Initially this study concentrates on the combined effects of sliding speed (either 0.314 m/s or 0.905 m/s, supplementing previous testing at 0.654 m/s) and temperature (between room temperature and 750 C) - by altering either or both of these variables, the nature of the wear process can be radically altered, encouraging or suppressing wear protective oxide or glaze layer formation. Extensive characterisation is conducted of the glaze layers during this study, using a wide range of tools including optical microscopy, SEM, EDX (spot, mapping and Autopoint), XRD (including Glancing Angle) and micro-hardness. On selected samples, TEM and STM show these glaze layers to be nano-structured (nano-crystalline), with an estimated grain size of as little as 2 to 10 nm.

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