

EFFECT OF HIGH PERFORMANCE POLYMER COMPOSITES ON CONTACT TEMPERATURE DURING RUBBING

A. Jean-Fulcrand^a, M. Masen^a, T. Bremner^b, J.S.S. Wong^{a*}
*j.wong@imperial.ac.uk

^a Department of Mechanical Engineering, Imperial College London,
SW7 2AZ, UK

^b Hoerbiger Corporation of America, Inc., Houston,
TX 77023, USA

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ABSTRACT

High performance polymers such as Polybenzimidazole (PBI) and Polyetheretherketone (PEEK) are increasingly used in tribological applications under high temperature and corrosive environments due to their self-lubricating properties. However the main limiting factor for demanding applications is the excessive heat generated from friction. The increase in contact temperature during rubbing will affect the material properties as well as the transfer film formation. In this work, an infrared thermography technique [1] was applied to map the contact temperature *in-situ*. The technique uses a camera with IR detector to collect thermal radiation from the sample with known emissivity, which is related to temperature. In this study, the contact temperature was measured between a polymer ball and sapphire counterface at different speeds. The frictional behaviour of the different polymers and blends was then correlated to the rate of heat generated inside the contact. It was observed that an increase in speed increases the temperature rise within the contact area. The properties of the polymer and blends greatly influenced the heat accumulation inside the contact. Finally the interfacial temperature due to frictional heating was estimated with a temperature prediction model [3] and compared to the experimental data.

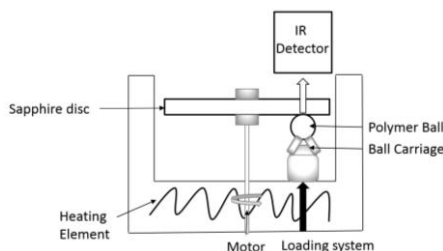


Figure 1: EHL -IR camera set-up

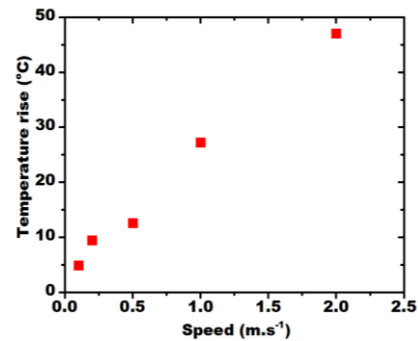


Figure 2: Contact temperature rise of PBI under different speeds

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