Observations of a Carbon/Carbon composite interface under thermal and tribological solicitations

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Abstract

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Wear; Friction; Pin on Disk Tribometer

ABSTRACT

- **Introduction**

To assure the efficiency of aeronautical braking operations, high performance break disks made of Carbon/Carbon composites are usually used.

This material is notably characterized by its low density and the stability of its mechanical and thermal properties at very high temperatures.

Studies around the tribological behaviour of C/C composites have been led to understand the wear mechanisms induced by the friction. Goudier et *al.* (1) and Kasem et *al.* (2) have studied the physicochemical reactions occurring during the transition of the friction coefficient. As temperature influences the wear rate, thermal contributions also need to be included.

In this context, this work aims to link thermal and tribological contributions to the wear mechanisms of C/C composites.

2. Methods

To reproduce a Carbon/Carbon composite interface, a Pin on Disk tribometer has been used. Different conditions have been experimented as the setup allows to impose various pressures, rotation speeds and initial temperatures. The experiments are limited to a unique

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environment (air, 50% relative hygrometry).

Measurements of both thermal (temperatures in the pin and the disk by thermocouples) and tribological (normal and tangent efforts used to determine a macroscopic friction coefficient) are performed all along the experiments.

Images of the friction interface are also captured by both high-speed and IR cameras. Those observations allow to study the contributions of the interface's components.

3. Results

By measuring the friction coefficient under various conditions, the influence of both mechanical (pressure, rotation speed) and thermal (interface temperature) can be determined.

Then, local observations have shown the contributions of the microstructure and the third body on the friction.

REFERENCES

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