Fundamental Research on Tribology of PTFE Wear Parts Opens Windows of Opportunity for Improved Materials

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4th Conference of the EFRC
June 9th / 10th, 2005, Antwerp

Abstract:

Rings and Packing materials based on Polytetrafluoroethylene (PTFE) compounds have become the standard in the compressor industry, in lubricated compressors as well as in demanding non lube installations.

Despite the comprehensive research on PTFE wear over the last decades, many topics like the fundamental mechanisms of wear, the chemical reactions in the friction area, the load and temperature distribution on micro scale, the transient behaviour of the transfer film, the filler working principles and the interactions of these effects are not yet fully understood.

The investigation of wear probes prepared under controlled conditions (speed, load, gas atmosphere, moisture, counter surface, direction of motion,..) by using most recent analysing techniques (SEM, TEM, IR, TOF-SIMS, Auger,..) permits the insight into the governing mechanisms of wear and influencing parameters. In this paper the fundamental new findings are presented and conclusions for improved materials are drawn.