

Effect of Surface Texture on the Dynamic Friction Behavior of PTFE Sealing Materials

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Abstract

PTFE is widely used as a sealing materials due to its low friction coefficient. With the development of surface texture technology, it is possible to improve the sealing life of PTFE under complex environments such as high pressure and oil medium. So dynamic friction test platform is developed for simulating the high pressure, oil medium environments. Then, the effects of different loads, speeds and textured surface on the dynamic friction characteristics are studied. Fluid-solid coupling simulation model of textured PTFE has been developed by ABAQUS. Results indicate that friction coefficient increases with increasement of slip speed; friction force cannot be reduced by texturing PTFE; however, the friction force of textured PTFE decreases under oil condition compared with conventional PTFE seal. The complex evolution law of surface deformation and contact in dynamic friction process have been revealed, which lays the foundation for high performance sealing materials and structural design.

Keywords: Sealing, PTFE, Surface Texture, Dynamic friction, Finite element analysis