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Investigating the effect of LaF_3 on the tribological performances of an environment friendly hydrophilic polyamide imide resin bonded solid lubricating coating

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Abstract: The aims of this study are to prepare a new environment friendly hydrophilic polyamide imide (PAI) resin bonded molybdenum disulfide (MoS_2) solid lubricating coating and investigate the tribological properties and wear mechanism. It is concluded that the preparation of hydrophilic coating has greatly reduced usage rates of fossil fuel, in the meantime, the basic physical and chemical properties, mechanical and tribological behaviors of hydrophilic coatings with 3 wt.% LaF_3 are comparable to that of solvent-based resin coatings, the generation of FeF_2 and FeS significantly improves the adherence between friction pairs, and the degree of oxidation of MoS_2 lubricant is effectively restrained on account of the attachment of nano-LaF_3 to the surface of MoS_2.

Keywords: environment friendly, hydrophilic PAI resin bonded solid lubricating coating, friction and wear, wear mechanism

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