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Effect of heat treatment on the tribological behaviors of polyelectrolyte/Au nanoparticles composite films

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Abstract:

PAH/Au/PAH/PAA film was prepared by the layer-by-layer (LbL) method. AFM and micro-tribometer were used to evaluate the frictional and wear behaviors of the film. The result indicated that heat treatment can improve the bonding force of the film because of the conversion from electrostatic interaction to covalent bond. Which greatly enhanced the film's anti-wear life. However, the film surface's roughness increases dramatically and uniformity decreases with longer heating time. Which would influence the friction and wear performance of the film. Thus, the heating time is a critical parameter in the prospect of improving the film layers bonding strength, consequently enhancing the wear-resistant of the polyelectrolyte/Au nanoparticles multilayer film.

Keywords: Polyelectrolyte multilayers; Au nanoparticles; Heat treatment; Tribology

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