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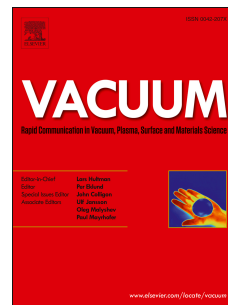
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Tailoring of the interface morphology of WS₂/CrN bilayered thin film for enhanced tribological property

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Abstract:

The WS₂/CrN bilayered films with different interface morphologies between WS₂ and CrN layer were prepared by physical vapor deposition. By controlling the deposition parameters, the surface of CrN interlayer exhibited compact granular structure when deposited under low partial pressure of Ar while a cone array-like surface appeared under high Ar partial pressure. The surface texture of the CrN interlayer had a great effect on the tribological performance of the WS₂/CrN film. The compact CrN textured WS₂ film exhibited a wear life about 2.6×10^5 cycles while the optimal cone array-like CrN textured WS₂ film showed a much longer wear life reaching to 6.8×10^5 cycles, which was more than 2.6 times of that for compact CrN textured WS₂ film and 3.5 times of that for WS₂ film without the CrN interlayer. The improved tribological property of the optimal cone array-like CrN textured WS₂ film was attributed to the high adhesion between the WS₂ layer and the CrN interlayer.

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