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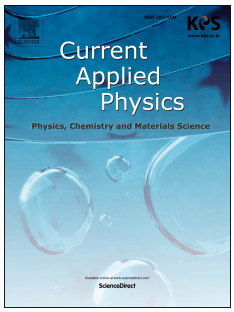

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Understanding the friction behavior of sulfur-terminated diamond-like carbon films under high vacuum by first-principles calculations

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Abstract: Generally, the repulsive force was a key factor account for superlow friction of H or F doped diamond-like carbon (DLC) films under high vacuum. As we known, H or F doped DLC usually exhibited superlow friction under high vacuum. However, the superlow friction of S doped DLC under high vacuum was not found so far. This phenomenon was desirable to be well investigated. In this work, S-terminated diamond interfaces also exhibited strong repulsive force, however, the estimated friction coefficient was variable for S-terminated diamond interfaces. The lowest and largest friction coefficient was about 0.003 and 0.4 respectively, which indicated that the superlow friction of S doped DLC could achieve in theory. In order to well probe the unusual friction behavior of S doped DLC under high vacuum, using first-principles method, the repulsive interaction between sliding surfaces was well investigated in order to understand the unusual friction behavior of S doped DLC films.