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PROCEEDINGS

Advances in Thermally-Driven Rotary Nanomotor from Carbon Materials

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ABSTRACT

Rotary nanomotor, as the essential component of a dynamic nanomachine, can output rotation via its rotor. So far, several techniques e.g., electric-, nanofluid-, laser-, chemical-, and thermally-driven models, have been proposed to actuate a rotary nanomotor,. Among the techniques, the thermally-driven rotary nanomotor (TDRM) models are the simplest technique that does not require an accurate external field as into energy. The model says that the thermal vibration of the atoms in the nanomotor can transmitted into rotationally kinetic energy via a rotor. Cai et al. [1] discovered the TDRM when relaxing double-walled carbon nanotubes (CNTs) at an NVT ensemble. Soon after, such thermal ratchet nanomotor with controllable rotational direction was built by the team [2]. Based on the principle, the rotary nanoring models [3], measuring the giga-hertz rotation of the nanomotor [4], diamond needles-driven CNT [5] or graphene flake [6] to rotate were realized. Li and Han [7] introduced a defective graphene to drive the CNT-rotor. Recently, Cai et al. [8] studied the dynamic response of a bladed-rotor sinking in water when driven by both thermal vibration and an external rotary electric field. Further research is required for developing new TDRM models with controllable output.

KEYWORDS

Nanomotor; carbon nanotube; thermally-driven model; molecular dynamics

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