عنوان مقاله:

Effect of Polymer Additives on Liquid Drop Impact on a Solid Surface Using MDPD Method

محل انتشار:

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

Understanding liquid drop behavior after collision on a solid surface is remarkable for wide variety of scientific and industrial applications. In this regard several experimental as well as theoretical and numerical studies have been performed. Due to limitations of experimental and theoretical approaches, recently numerical procedures have been developed broadly for this purpose. A particle based scheme called Multi-body dissipative particle dynamics (MDPD) is one of these methods. In this method conservative force which depends on the local density leads to simulate multiphase systems especially liquid-vapor interfaces. In this work, MDPD method is applied to simulate the impact of Newtonian and non-Newtonian drops on a solid substrate. The non-Newtonian fluid used here is a low concentration of polyethylene oxide ۳۰۰k dissolved in the ۱:۱ mixture of water and ethylene glycol. The behavior of drop impact on solid surface with static contact angle of ۹۰o for two different cases when Weber number (We) and Ohnesorge number (Oh) are ۶ and ۰.۱۵۸۸ ± ۰.۰۴۸, respectively and when Weber numbers increase to ۳۰, indicates that the added polymer to Newtonian drop causes notable changes in spreading factor and dimensionless height. In other words, Newtonian and non-Newtonian drops during spreading have a similar behavior while in receding phase they act differently.

کلمات کلیدی:

Dissipative Particle Dynamics, MDPD, Drop impact on a solid surface, Polymer

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