



FEATURES OF LIQUID DROPLET DYNAMICS AT THE INTERFACE OF TWO IMMISCIBLE MEDIA

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Fluid: air – oil - water

Visualization method(s): video camera

Other keywords: submerged jets, umbrella-like and helical structures

ABSTRACT: Now investigations of droplet motion in liquid media are being developed intensively. The droplets, which cross the interface between liquid layers, where intensive heat transfer with ambient medium, chemical reactions, etc. occur, or lie on this interface, are of a particular interest [1]. These studies are interesting for hydrology, biology and other sciences [2]; they can be applied for development of modern technologies [3].

This work presents visualization results on dynamics of droplets, formed on water or ethanol basis and put at the air + oil boundary in the three-layer system: air – oil - water. The following liquids were used for droplet formation: ethanol solutions of iodine (5%), brilliant green (1%), and water solution of rhodamine. The droplet diameter was varied within 1 – 5 mm. The temperatures of used liquids were the same and equaled 20 – 25°C. Transparent walls of the vessel allowed visual observations and registration by a video camera.

It is shown that at the boundary of immiscible media the droplets on ethanol basis behave unusually. Under some certain conditions liquid starts flowing from these droplets, forming a submerged jet, whose trajectory has the complex umbrella-like (Fig.1a) or helical (Fig. 1b) character. A wide class of dynamic structures formed at droplet motion in immiscible liquid layers is discussed in this work.

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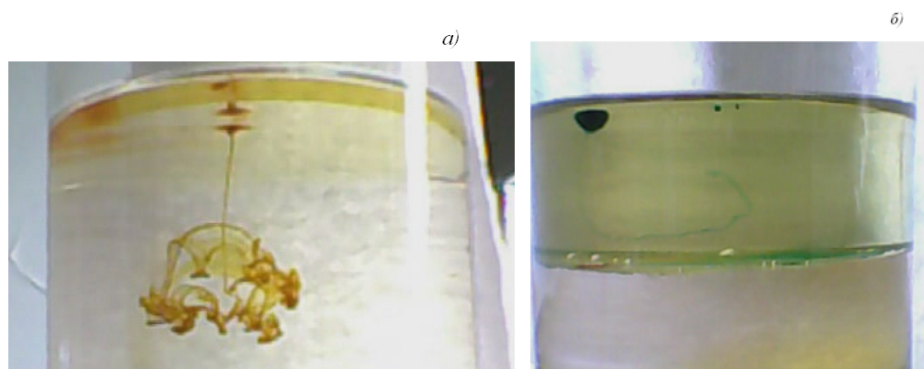


Fig. 1 The visualizations of submerged jets, flowing from droplets.

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