DROP SPRAYING USING A VIBRATING SURFACE UNDER INFLUENCE OF AN ELECTRIC FIELD

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The interaction of a liquid with a flexural wave using a vibrating beam has been studied previously. With given amplitude of the vibration it has been shown that a water drop, inside an appropriated range of volume, is able to move toward the antinode of a vibration. For that reason, it is possible to move the droplet along the beam by changing the vibration mode [1,2]. The acoustic radiation pressure here can explain the phenomena involved. The spray of a drop has also been observed. The amplitude required to get a displacement of the droplet is sometimes very close to the one required to spray the droplet. So the difficulty is how to get the best separation between these two phenomena, namely drop displacement or drop spraying. The experiment shows that for water the vibration amplitude for spraying is about 1.5 times greater than the amplitude required for the displacement of the drop. Influence of the viscosity has been studied using a water-glycerol mixture and it will be shown that it influences more the spraying than the displacement of the drop. This paper is then devoted to the influence of simultaneous action of vibration and a potential applied to the vibrating beam. This potential produces an electric field at the drop surface. First, the influence of the electric field on the threshold of spraying has been considered. Then, experimentation shows that this threshold does not vary in a measurable range at least for a potential up to 2 kV. Nevertheless the applied electric field produces important variation for the behavior of micodroplets obtained during the spray. Different results about this phenomenon will be presented.

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