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The Role of Wettability on the Shedding of Drops¹ LUKESH KUMAR MAHATO, MAYARAM SAHU, ANIMESH G. KUJUR, DEEPAK KUMAR MANDAL, Indian Institute of Technology (ISM) Dhanbad — The study explores how a small change in the contact angle (CA) of a drop makes a difference in the shedding from a surface with similar wettability. Three oleophobic surfaces, polystyrene (static CA of 93°), tin (104°) and glass (118°), were chosen. Silicon oil drops (350cSt) of various volumes were shed due to water shear flow. The velocity of shedding of a drop when the adhesion is balanced by the drag provided by the shear-flow, is termed as the critical velocity (U_{cr}). The results show that U_{cr} for a given drop on the polystyrene surface is higher than that of the tin and glass surfaces. The higher contact length for drops on polystyrene surfaces, makes the adhesion higher. The lower frontal area makes less drag to be applied for the same velocity of the shear-flow. Therefore, higher drag becomes necessary for the shedding. So, the U_{cr} increases with the wettability (polystyrene < tin < glass). The CAs of a drop predominantly found to control the shedding. The U_{cr} is found to decrease with the increase in the volume for a given surface. Bigger drops provide higher frontal area and makes the drag higher. The flow map is discussed from a modified Weber and Ohnesorge numbers.

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