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Water Drop Shedding under Icing Conditions from Surfaces with Different Wettabilities DEEPAK KUMAR MANDAL, York University, ANTONIO CRISCIONE, Technical University of Darmstadt, ALIDAD AMIRFAZLI, York University, TECHNICAL UNIVERSITY OF DARMSTADT TEAM, YORK UNIVERSITY TEAM — A sessile water drop on a substrate exposed to airflow will shed if the adhesion force is overcome by external forces on the drop. There are a number of theoretical and experimental studies examining the shedding of drops as described in the normal laboratory conditions. Drop shedding under icing conditions is not well understood; this is not only important from fundamental perspective, but also for technological applications such as icing of aerodynamic surfaces (e.g. wings of an aircraft). An icing wind tunnel was designed where both airflow and surface temperature (system temperature) can be lowered up to -10 °C. Drop shedding on surfaces with different wetting characteristics (from hydrophilic to superhydrophobic) were investigated to determine critical air velocity at which the drop starts to shed. Water drops of different volumes (5 - 100 μl) were used to analyze the influence of the drop volume on the critical air velocity for shedding on cold surfaces. Results show that the system temperature and wetting properties have a major influence on drop shedding under icing conditions. The critical velocity for drop shedding decreases as the volume of the droplet increases for a particular surface. The influence of different surface and ambient temperature on the shedding of the droplet will be presented.

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