



Surfaces phases of *n*-butanol and the effect on water uptake

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Water interactions with organic surfaces are of central importance to both biological and geophysical processes. In the atmosphere the hygroscopicity of primary and secondary aerosols, and the formation and lifetime of cloud droplets and ice particles can be influenced by organic coatings. Here we report findings from Environmental Molecular Beam measurements of butanol surfaces at temperatures relevant in the upper atmosphere, 160-200 K. Within ± 5 K of the bulk melting temperature 184.5 K, surface butanol is observed to have phase transition behavior distinctly different from what is expected from a purely bulk viewpoint. The existence and extent of surface disorder over a 10 K range straddling the bulk melting temperature is observed to affect the molecular kinetics of impinging water, and leads to identifiable regimes of butanol-water interaction. The implications for water uptake by atmospheric particles is discussed.