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Pristine ices on TNOs and Centaurs

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Abstract

Trans-Neptunian's objects and Centaurs are known to be amongst the most remnant icy bodies of the solar system formation. Discovered in the early 90's, our knowledge of the surface of these atmosphere-less bodies is still limited due to their faintness. However, recent observations performed with 8-meter class telescopes allowed to obtain new chemical information from near-infrared spectroscopy [1]. Most of these objects seem to be covered by ices (predominantly H_2O), themselves covered by darker and/or redder irradiated materials assumed to be generated from space weathering. The goal of this work is to investigate the presence of possible H_2O-CH_3OH icy mixture on the surface of the Centaur Pholus ([2] or more recently [3]) or on the surface of the TNOs 2002 VE_{95} [4] and 2004 TY_{364} [3]. This mixture is particularly interesting because of its possible pristine nature (these two ices are probably the most abundant ices in the proto-stellar and planetary disks [5]) and because it gives new constraints on the surface properties and evolution processes of this population of objects. We present spectral models and laboratory measurements that have been made in order to constrain the chemical nature of these objects, and give information on the spectral properties of the CH_3OH-H_2O mixture depending on the ratio of each component and the ambient temperature.

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