

Detecting water-ice in extreme OH/IR stars

K. Justtanont¹G. Olofsson¹

¹Stockholm Observatory, AlbaNova University Center, SE-106 91 Stockholm, Sweden

Abstract. A sample of 17 extreme OH/IR stars were searched for the presence of water-ice absorption at $3.1\mu\text{m}$ using the Stockholm Infrared Camera (SIRCA) on the Nordic Optical Telescope (NOT). The stars have been selected on the basis of their deep $10\mu\text{m}$ silicate absorption. With supplementary ISO and UKIRT data which increased our sample to 23 stars, we found 50% of our sample show the water-ice absorption. Of those which show water-ice absorption, there seems to be a correlation between the optical depths of the silicate and water-ice. However, from the silicate feature alone, it is not possible to predict which stars would exhibit the water-ice signature.

Stars which have water-ice condensing in their circumstellar envelope show the near-IR deficiency, implying that there is possibly another dust component condensing at the same time. Alternatively, this deficiency can be due to the gaseous water in the circumstellar envelope which efficiently absorbs the radiation between $3\text{--}7\mu\text{m}$.

When comparing the derived dust mass loss rate with the gas mass loss rate derived from the OH masers, it is clear that the epoch of intense mass loss rate giving rise to the deep $10\mu\text{m}$ silicate absorption has started only recently, i.e., ≤ 2000 yrs.

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