Astrochemistry: Recent Successes and Current Challenges
Poster Book IAU Symposium No. 231, 2005
A. J. Markwick-Kemper, ed.

DOI: 00.0000/X000000000000000X

Dust populations and increased large-grain emissivity in a translucent cloud

M. Ridderstad[1], M. Juvela[1], K. Lehtinen[1], D. Lemke[2] and T. Liljeström[1]

[1]Helsinki University Observatory, Tähtitorninmäki, P.O. Box 14, FIN-00014 University of Helsinki, Finland
email: marianna@astro.helsinki.fi

[2]Max-Planck-Institut für Astronomie, Königstuhl 17, D-69117, Germany

Abstract. The properties of dust in the high galactic latitude translucent cloud Lynds 1780 have been analyzed using ISOPHOT maps at 100μm and 200μm and raster scans at 60μm, 80μm, 100μm, 120μm, 150μm and 200μm. In far-infrared (FIR) emission, the cloud has a single core that coincides with the maxima of visual extinction and 200μm optical depth. Using 2MASS data, the maximum visual extinction of 4.0 mag at 3.0' resolution has been obtained. The minimum temperature and the maximum 200μm optical depth at the cloud core are 14.8 K and 1.7×10^{-3}, respectively, at the resolution of 1.5'. The cloud mass has been estimated to be $18 M_{SUN}$. No star formation has been observed. The FIR observations suggest the presence of different, spatially distinct dust grain populations in the cloud: the FIR maximum at the dense core of L1780 is the realm of large grains, whereas very small grains (VSGs) and PAHs have separate maxima on the Eastern side of the cold core, towards the "tail" of this cometary-shaped cloud. Our FIR observations combined with the optical extinction data indicate an increase of the emissivity of the big grain dust component in the cold core, suggesting grain coagulation or change in the properties of the large grains. Based on the ISO observations, the question to what extent the 80μm emission and even the 100μm emission contain a contribution from the "small grain dust component", is also addressed.

Keywords. ISM: clouds – infrared: ISM – ISM: individual objects: L1780