# Ices in star-forming regions:

## highlights from ISO, laboratory and theory

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**Abstract**

ISO allows to study for the first time the complete inventory of interstellar ices. We present ISO observations of bright star-forming regions with the Short Wavelength Spectrometer (SWS) and Long Wavelength Spectrometer (LWS). First results showed the ubiquitous presence of abundant $CO_2$ ice in space and provided new insights in the gas to solid ratio of many interstellar molecules. According to their evolutionary state, young objects show interstellar ice features such as $H_2O$, CO, $CO_2$, $CH_4$ (and other minor species), as well as interstellar gas features, such as $H_2O$, CO and $CO_2$. The more evolved objects are dominated by strong atomic emission lines and polycyclic aromatic hydrocarbons (PAHs). Using the combined information of interstellar gas and dust in comparison with laboratory results and theoretical models we determine the line-of-sight conditions towards massive star formation regions. We constrain gas/grain interactions, temperature and irradiation conditions and discuss the ISO spectra between 2.5 - 200 $\mu$m of star-forming regions in the context of their evolution. Well established abundances of interstellar molecules will guide the interpretation of past and future cometary observations. These new ISO results thus allow to study the connection between interstellar and cometary dust and consequently provide constraints on the formation of the Solar System.