N50a   ISO/SWS Observations of Carbon Stars

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We report results of spectroscopic observations of carbon stars by the SWS (Short-Wavelength Spectrometer) on board the Infrared Space Observatory (ISO). The observations are carried out as part of the guaranteed time program AGBSTARS, which aims at studying a well-defined sample of bright AGB stars varying in evolutionary status and mass-loss rate. In our program, carbon stars are distributed over five groups basically according to the near-infrared color temperature, T_{NIR} (Groenewegen et al. 1992 A&A, 253, 150), related to the thickness of the circumstellar envelope. Our present dataset contains two stars in group II (visually bright carbon star; $T_{NIR} < 2000K$), two in group III (star with a relatively thick envelope; $1000K < T_{NIR} < 2000K$) and one star in group IV (infrared carbon star; $T_{NIR} < 1000K$).

The observations were carried out in the AOT01 mode, which covers the full spectral range of the SWS from 2.38 to 45μm with a resolution of $\lambda/\Delta\lambda = 300 - 800$. Here we report the following preliminary results.

1. At wavelengths shorter than about 15μm the spectrum is dominated by molecular features of C_2H_2, HCN, CO etc. At wavelengths longward of about 15μm the spectrum is almost featureless, contrary to what is observed in oxygen-rich stars (Justtanont et al. 1996 A&A, 315, L217; Waters et al. 1996 A&A, 315, L361)

2. The energy distribution, as well as the shape and strength of individual spectral features are quite similar for stars in the same group but differ substantially from group to group.

Although the sample available at the moment is not large enough to draw final conclusions, our data imply that the infrared spectra of carbon stars are closely related to T_{NIR}, i.e. to the magnitude of the mass-loss rate. The interpretation of this relation will be discussed during the presentation.