[구ST-03] OH, SiO and H_2O maser emission in O-rich AGB stars

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We investigate properties of maser emission for 3373 O-rich AGB stars. We divide the sample stars into four different groups whether they were detected by OH, SiO and H_2O maser emission or not. To understand the nature of the maser sources, we present various infrared two-color diagrams (2CDs) using IRAS, near infrared and AKARI data. For each group, we compare the positions on the various infrared 2CDs with theoretical models. We find that OH maser sources generally show higher color indices and larger dust optical depths than SiO or H_2O maser sources. This could be due to differences of the mass-loss rates and/or variability which may influence the maser pumping mechanisms.

[구ST-04] IRAS 09425-6040: A Silicate Carbon Star with Crystalline Dust

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The silicate carbon star IRAS 09425-6040 shows very conspicuous crystalline silicate dust features and excessive emission at far infrared. To investigate properties of dusty envelopes around the object, we use radiative transfer models for axisymmetric and sphericallly symmetric dust distributions. We perform model calculations for various possible combinations of dust shells and disks with various dust species. We compare the model results with the observed spectral energy distributions (SEDs) including the IRAS, ISO, AKARI, MSX and 2MASS data. We find that a model with multiple disks of amorphous and crystalline silicate and multiple spherical shells of carbon dust can reproduce the observed SED fairly well. This supports the scenario for the origin of silicate carbon stars that oxygen-rich material was shed by mass loss when the primary star was an M giant and the O-rich material is stored in a circumbinary disk. Highly (about 75 %) crystallized forsterite dust in the disk can reproduce the conspicuous crystalline features of the ISO observational data. This object looks to have a detached silicate and H2O ice shell with a much higher mass-loss rate. It could be a remnant of the chemical transition phase. The last phase of stellar winds of O-rich materials looks to be a superwind.