THE FIRST EXTENSIVE MOLECULAR STUDY OF AN OXYGEN-RICH PLANETARY NEBULA: OBSERVATIONS OF SiO, SO_2, AND SO

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A majority of stars will go through the Planetary Nebula (PN) phase during their stellar lifetimes, becoming significant contributors to the chemical enrichment of the interstellar medium. Planetary Nebulae (PNe) in general are poorly understood, both physically and chemically. The PN M2-48 is an interesting candidate for study because not only is it clearly oxygen-rich, but also because it has an age of ~5,000 years; i.e. is about mid-way through the PN stage. Previous studies of PNe have been in either very young (~700-1,500 years) or very old (~12,000 years) objects. Observations of M2-48 have been carried out with the Sub-Millimeter Telescope and the 12-meter Antenna of the Arizona Radio Observatory. CO, CN, HCN, HNC, HCO^+, CS, SO, SO_2, and SiO have been detected. CS and SO were recently detected in the barely oxygen-rich NGC 6537, but this is the first detection of SO_2 and SiO in a PN. Indeed, age does not appear to dictate PN chemistry, but rather the chemical makeup of the progenitor AGB star. Analysis is currently under way to model the molecular abundances in this object. Most current results will be presented.