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TITLE: The formation of aromatic molecules in heavily obscured post-AGB stars with O-rich masers

ABSTRACT BODY:

Abstract Body: We report Spitzer/IRS spectra of a small sample of heavily obscured and high mass loss post-AGB stars with O-rich maser emission. IRAM 30 m observations for two post-AGBs are also reported. The Spitzer/IRS spectra show the C-rich character of their circumstellar envelopes (CSE), as revealed by the presence of small hydrocarbon molecules such as C_2H_2 , C_4H_2 , C_6H_2 , C_6H_6 , and HCN. Benzene (C_6H_6) is detected toward two sources in our sample, bringing up to three the total number of Galactic post-AGB objects where this molecule has been detected. The available IRAM 30 m data confirm that the central stars are C-rich, despite the presence of O-rich masers, and the presence of high velocity molecular outflows together with extreme mass loss rates ($10^{-4} M_{\odot} \text{ yr}^{-1}$). Our Spitzer and IRAM 30 m observations confirm the model of Cernicharo (2004) that predicts a rich photochemistry in the neutral regions of these objects on timescales shorter than the dynamical evolution of the central HII region, leading to the formation of large, complex carbon-rich molecules. This model also explain the presence of O-rich masers in C-rich post-AGB stars as a consequence of the extreme mass loss rate, being not necessary to invoke a chemistry change in their circumstellar envelopes.

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