

CHEMICAL ENRICHMENT AND CENTRAL STAR PROPERTIES

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ABSTRACT. We have selected a sample of planetary nebulae, for which the core masses are determined using distance-independent parameters (Zhang and Kwok 1992). The chemical abundances of He, N, O, and C are taken from the literature for them. Relationships of the ratios of He/H, N/O, and C/O with various stellar parameters of planetary nebulae (PN), such as the core mass, the mass of the core plus the ionized nebular gas, the stellar age and temperature, are examined. It is found that the N/O increases with increasing mass, while the C/O first increases and then decreases with the core mass. No strong correlation seems to exist between the He/H and the core mass. A correlation of the N/O and He/H with the stellar temperature exists. The current dredge-up theory for the progenitor AGB stars cannot satisfactorily account for these patterns of chemical enrichment in PN. Furthermore, the correlations of the N/O and He/H with the stellar age and temperature indicate that besides the dredge-ups in the RG and AGB stages, physical processes that happen in the planetary nebula stage may also play a role in forming the observed patterns of chemical enrichment in the planetary nebulae.

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References

Zhang, C.Y., and Kwok, S. 1992, A&A (in press)