

UV AND OPTICAL ABUNDANCES FOR A SAMPLE OF SOUTHERN GALACTIC PLANETARY NEBULAE

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We present abundances for a sample of 57 southern hemisphere galactic planetary nebulae (PN). Optical spectra covering the 3100–7400 Å range were obtained at the AAT. Low resolution UV spectra obtained with the IUE satellite were available for half of these objects and were accessed via the IUE Uniform Low-Dispersion Archive. Additionally, new low resolution IUE SWP observations of Fig 1, M 3-1 and M 3-3 were obtained.

The abundance analysis includes a derivation of He/H, O/H, N/H, C/H, Ne/H, Ar/H and S/H ratios (by number). Helium abundances were derived following Clegg (1987, MNRAS 221, 31p). In the cases where unseen stages of ionization are present, we use ionization correction factors which are not only based on the similarity of ionization potentials of various ions, but also incorporate results from 10 detailed ionization structure models (Walton et al., 1992, in prep.). We classify five PN in this sample as Type I: He 2-111, NGC 2440, He 2-15, He 2-112 and NGC 5189; all have $\log(N/O) \geq -0.3$ and $He/H \geq 0.125$ and are bipolar in appearance. The mean oxygen abundance for 51 non-Type I PN is found to be $12 + \log(O/H) = 8.66 \pm 0.31$. We find one object with high oxygen abundance, PC 14, whose $12 + \log(O/H) = 9.16$.

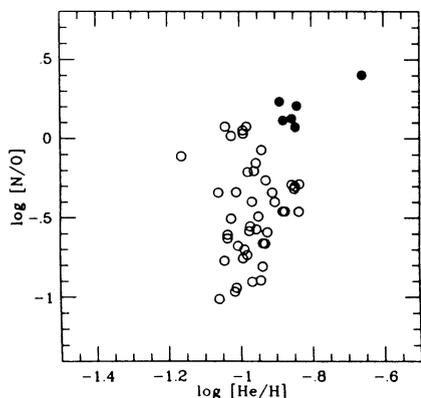


FIGURE 1 plots $\log(N/O)$ vs. $\log(He/H)$. Filled circles are Type I PN. N/O is strongly correlated with He/H for only the Type I PN. For the remainder of the sample a continuous range of N/O is found, with He/H ranging from ~ 0.09 to 0.14 . For the 52 non-Type I PN, we find a mean He/H ratio of 0.111 ± 0.017 by number.

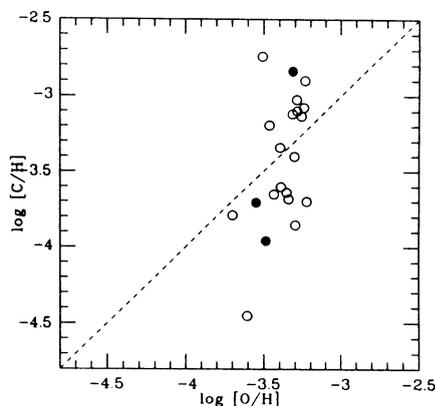


FIGURE 2 plots $\log(C/H)$ vs. $\log(O/H)$. Filled circles are Type I PN. For this sample of 21 PN, we find the ratio of carbon-rich to oxygen-rich PN to be $\sim 50\%$. This value is somewhat lower than, but consistent with, the ratio of 62% found by Zuckerman & Aller for a sample of 68 galactic PN (1986, ApJ 301, 772).