CHEMICAL ABUNDANCES IN MAGELLANIC CLOUD PLANETARY NEBULAE

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ABSTRACT. Optical spectroscopic data for 71 Planetary Nebulae (PN) in the Large and Small Magellanic Clouds have been analysed. The line fluxes have been used to determine nebular temperatures, densities, and the abundances of He, N, O, Ne and Ar, relative to H. In our sample there are 12 nebulae with N/O $\geq$ 0.5, resembling Peimbert's Type I PN; 6 low excitation (LE) objects ($1 \leq I(5007)/I(H\beta) \leq 4$); and 4 very-low-excitation (VLE) nebulae ($I(H\beta) > I(5007)$), similar to the Galactic VLE class. Mean abundances have been calculated for the nebulae not in these special groups.

After correction for collisional excitation contributions to the nebular He I lines, the abundance of helium in the PN is found to be the same as that in H II regions in the LMC and SMC. A helium mass fraction of $Y = 0.247 \pm 0.009$ is consistent with all of the data on nebulae in both Clouds.

Compared to PN in our own galaxy, the abundances of Ne and Ar, which are the elements in our sample least affected by nucleosynthesis, are lower by 0.6 and 0.3 dex for the SMC and LMC respectively. The oxygen and neon abundances in the Magellanic Cloud PN are the same as those previously found for H II regions in the LMC and SMC, but the nitrogen in PN is enhanced by 0.9 dex and 1.0 dex in each galaxy respectively. This is consistent with the processing of all of the original carbon to nitrogen by the CN cycle operating in the progenitor stars.

S. Torres-Peimbert (ed.), Planetary Nebulae, 354.