

Sulfur, Chlorine & Argon Abundances in a Southern Sample of Planetary Nebulae

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We present S/O, Cl/O, and Ar/O abundance ratios for 45 predominantly Type II southern PNe. These abundances are based upon line strengths from newly acquired spectrophotometry covering an extended optical range from 3600 - 9600 Å. The following average abundance ratios were obtained from this sample: S/O=0.011±0.0064, Cl/O=0.00031±0.00012, and Ar/O=0.0051±0.0020. This study, together with a sample of northern PNe, is aimed at producing a large homogeneous set of observations and abundances. Specifically, we are addressing the lack of homogeneously observed, reduced, and analyzed data sets that include the NIR [S III] lines at 9069 and 9532 Å. The data provided by these PNe samples enables us to look for consistency between S⁺² abundances inferred from these lines and from the more accessible, albeit weaker, [S III] line at 6312 Å. We find reasonable agreement between S⁺² determined from the NIR lines and the λ6312 line. This speaks positively for the use and reliability of the NIR lines, despite clearly recognized telluric effects in that portion of the spectrum. The consistent ionic abundance results breathe new life into our treatment of the telluric problem and the use of these strong lines for extrapolating total sulfur abundance. Type II PNe reside close to the Galactic disk and provide S, Cl, Ar, and O abundances free from nucleosynthetic self-contamination. These two qualities allow us to study massive star yields and map the distribution of these elements in radial abundance gradients. Finally, we compare our observed abundance trends with model predictions that are based on several sets of published stellar yields. (A companion paper in this volume by Kwitter & Henry discusses the northern subset observed at KPNO; see also Milingo et al. IIA, 2002, ApJS, 138, 279 and Milingo et al. IIB, 2002, ApJS, 138, 285)

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