THE SOLAR WIND FE/MG RATIO. D.S. Burnett[1], A.J.G. Jurewicz[2], Y. Guan[2], D.S. Woolum[3], K. McKeegan[4]
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To meet the Genesis mission goal for improved solar elemental abundances, we need to address the issue of fractionation of the abundances of elements in the solar wind compared to the solar photosphere. There is a well-established depletion of elements in the solar wind with high first ionization potential (FIP>9eV) compared to lower FIP elements, but there is no evidence for fractionation between lower FIP elements.

Using secondary ion mass spectrometry, we have measured the fluences of Fe and Mg for the "bulk" collector of the Genesis mission. Excellent solar wind depth profiles were obtained for Fe in diamond-like-carbon collector materials. Reasonable fluence agreement is found in replicate analyses among different samples. Integration of the depth profiles and comparison with an implant standard of known fluence yields an Fe fluence of $1.4 \times 10^{12}/cm^2$.

Excellent depth profiles for Mg in diamond-like-C are also obtained, but there are problems with fluence reproducibility, so at present, we base a Mg fluence on profiles measured in Si substrates. The profiles at shallow depths (< 40nm) appear to depend on whether a low pressure O_2 flood is used. Although additional study is required, the O_2 flood appears to significantly reduce problems due to Mg surface contamination. However, at depths than about 40nm the flood and no-flood profiles are in good agreement, as are the derived fluences. Fourteen profiles in 4 different Si samples are consistent with a Mg fluence of $1.8 \times 10^{12}/cm^2$.

Thus, the present Genesis solar wind Fe/Mg ratio is 0.78 which is in good agreement with both spacecraft data and the abundance ratio derived from photospheric absorption line spectra. Our ultimate goal is to obtain Genesis abundance ratios accurate to ~5% two sigma for major elements, whose photospheric abundances are also well known.