ISOTOPIC SPECIES IN PROTOPLANETARY DISKS. Paul M. Woods, Karen Willacy, *NASA Jet Propulsion Laboratory, MS 169-506, 4800 Oak Grove Drive, Pasadena, CA 91109, USA. (Paul.M.Woods@jpl.nasa.gov).*

The chemistry of the inner regions (<20 AU) of protoplanetary disks is a direct precursor to the early chemistry of Earth-like planets, whether organic molecules form in situ on the surface of terrestrial planets, or are transported there via impacting comets [1,2]. We have performed an initial investigation into the chemistry of these inner regions, concentrating particularly on ^{13}C isotopic variants of small organic molecules and biomarkers such as H_2O, CO_2, O_2 and CH_4. Isotopic species can be useful trackers in the formation mechanisms of more complex organic species. The results of this study can be used to direct searches for extrasolar biomarkers and habitable regions, feeding into projects such as NASA's Terrestrial Plant Finder mission.

The chemical model used is a revised version of that used by Willacy & Langer [3] to look at the importance of photoprocessing in flared disks; this model also includes the grain chemistry of Hasegawa & Herbst [4,5]. It incorporates 120 gas and grain-based species, with a total of over 2,000 gas and grain reactions in the network. Abundances are calculated at a number of radii and at different scale heights above the midplane of the disk. These are converted into column densities through the disk in order to give a straightforward comparison with observations. Both H_2 and CO self-shielding are accounted for, as is self-shielding of ^{13}CO, using the results of van Dishoeck & Black [6].

References:

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