Dr.
Yuri Aikawa

Graduate School of Science, Kobe University
1-1 Rokkodai, Nada-ku,
Kobe 657-8501, Japan
Phone: +81-78-803-5741, Fax: +81-78-803-5791
E-mail: aikawa [at] kobe-u.ac.jp

Chemistry in the Formation of Stars and Planetary Systems

I will review the theoretical models and observations of chemistry in star-forming cores and protoplanetary disks. Stars are formed by gravitational contraction of molecular cloud cores. Because of low density (~10^3cm^{-3}) and low temperature (10K), clouds are not in chemical equilibrium. Molecular compositions vary with time and physical conditions, which change along the star-forming processes, and thus can tell us the evolutionary stage of cloud cores. I will present hydro-chemical calculations of star-formation: from the dense cloud gas to the first hydrostatic core and protostar. Protoplanetary disks, which are the birth place of planetary systems, are naturally formed around protostars.

Several gas-phase molecules and ices are observed in protoplanetary disks in millimeter, sub-millimeter and infrared observations. Moleular composition in the disk varies spatially; it is mainly determined by the spatial distribution of density, temperature and incoming UV and X-rays radiation from the interstellar space and the central star. Turbulent mixing, grain growth and sedimentation, and gas dissipation also affects the chemistry.

References

(1) Aikawa et al. (2005)
(2) Aikawa et al. (2008)
(3) Bergin, Aikawa, vanDishoeck & Blake (2007)

CV

1998	PhD (Science) (The University of Tokyo)
1998-2000	JSPS Fellow Research Abroad (Ohio State University)
2000-2007	Assistant Professor, Department of Earth and Planetary Sciences, Kobe University
2008-present	Associate Professor, Department of Earth and Planetary Sciences, Kobe University