CURRICULUM VITAE

HIROSHI IMANAKA

Assistant Research Scientist
Lunar and Planetary Laboratory, University of Arizona
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Education: **University of Tokyo**, Bunkyo-ku, Tokyo, 113-0033, Japan, 1992-2004

Ph. D. in Earth and Planetary Science (Mar. 2004)
"Laboratory Simulations of Titan's Organic Haze and Condensation Clouds"

M.S. in Earth and Planetary Physics (Mar. 1998)
"Volcanic Lightning and Explosive Eruptions"

B.Sc. in Earth and Planetary Physics (Mar. 1996)
"Distribution of Subsurface Water under Martian Regolith"

Current and Previous Positions

2010-present	Assistant Research Scientist, Lunar and Planetary Laboratory/Univ. Arizona
2008-2011	Research Scientist, Department of Chemistry and Biochemistry/Univ. Arizona
2006-2008	Postdoctral Research Associate, Department of Chemistry/Univ. Arizona
2006-present	Principal Investigator, SETI Institute
2004-2005	Postdoctral Fellow, SETI Institute/NASA Ames Research Center
2001-2004	Graduate Research Student, SETI Institute/NASA Ames Research Center
2000-2001	Research Assistant, Department of Earth and Planetary Science/Univ. Tokyo
1998-2000	Teaching Assistant, Department of Earth and Planetary Science/Univ. Tokyo

Honors and Awards

NASA Early Career Fellowship (2009)

Publications

1. West, R., Lavvas, P., Anderson, C., **Imanaka, H.**, "Titan Haze", a Chapter for a Book entitled "Titan: Surface, Atmosphere and Magnetosphere", Edited by Mueller-Wodarg, I., Griffith, C., Lellouch, E., Cravens, T., Cambridge University Press, in press.
2. He, C., Guangxin, L, Upton, K., **Imanaka, H.**, Smith, M. A., Structural Investigation of Titan Tholins by Solution-State 1H, 13C, and 15N NMR: 1-Dimentional and Decoupling Experiments, *J. Phys. Chem. A,* 116, 4760-4767, 2012.
3. He, C., Guangxin, L, Upton, K., **Imanaka, H.**, Smith, M. A., Structural Investigation of HCN Polymer Isotopomers by Solution-State Multidimensional NMR, *J. Phys. Chem. A,* 116, 4751-4759, 2012.
4. **Imanaka, H.**, Cruikshank, D.P., Khare, B. N., McKay, C.P., Optical constants of Titan tholins at mid-infrared wavelengths (2.5 – 25 μm) and the possible chemical nature of Titan's haze particles, *Icarus*, 218, 247-261, 2012, doi: 10.1016/j.icarus.2011.11.018.
5. Lavvas, P., Sander, M., Kraft, M., **Imanaka, H.**, Surface Chemistry and Particle Shape: Processes for the Evolution of Aerosols in Titan's Atmosphere, *Astrophys, J.*, 728, 80 (11pp), 2011.
6. **Imanaka, H.**, Smith, M.A., Formation of nitrogenated organic aerosols in the Titan upper atmosphere, *Proc. Natl. Aca. Sci. USA*, 107, 12423-12428, 2010.
7. Smith, M.A., **Imanaka, H.**, Complex Organic Carbon on Abiotic Solar System Bodies; Titan as a model, *Geochem. News*, 142, Jan., 2010.
8. **Imanaka, H.**, Smith, M.A., EUV photochemical production of unsaturated hydrocarbons: implications to EUV photochemistry in Titan and Jovian planets, *J. Phys. Chem. A,*

113,11187-11194, 2009.
9. Niesh, C.D., Lunine, J.I., Somogyi, A., **Imanaka, H.**, Smith, M.A., Rate measurements of the hydrolysis of complex organic macromolecules in cold aqueous solutions: Implications for prebiotic chemistry on the early Earth and Titan, *Astrobiology,* 8, 273-287, 2008.
10. Sekine, Y., **Imanaka, H.**, Matsui, T., Khare, B.N., Bakes, E.L.O., McKay, C.P., Sugita, S., The role of organic haze in Titan's atmospheric chemistry I. Laboratory investigation on heterogeneous reaction of atomic hydrogen with Titan tholin, *Icarus.*, 194, 186-200, 2008.
11. Sekine, Y., Lebonnois, S., **Imanaka, H.**, Matsui, T., Khare, B.N., Bakes, E.L.O., McKay, C.P., Sugita, S., The role of organic haze in Titan's atmospheric chemistry II. Effect of heterogenous reaction to the hydrogen budget and chemical composition of the atmosphere, *Icarus.*, 194, 201-211, 2008.
12. **Imanaka, H.**, Smith, M.A., Role of Photoionization in the Formation of Complex Organic Molecules in Titan's Upper Atmosphere, *Geophys. Res. Lett.*, 34, doi:10.1029/2006GL028317, 2007.
13. McGuigan, M., Sacks, R., Waite, J.H., **Imanaka, H.**, Analysis of Titan Tholin Pyrolysis Products by Comprehensive Two-Dimensional Gas Chromatography-Time-of-Flight Mass Spectrometry, *J. Chromatogr. A*. 1182, 280-288, 2006.
14. Cruikshank, D.P., **Imanaka, H.**, C. M. Della-Ore, Tholins as Coloring Agents on Outer Solar System Bodies, *Adv. Space Res.*, 36, 178-183, 2005
15. **Imanaka, H.**, Khare, B. N., Elsila, J. E., Bakes, E.L.O., McKay, C.P., Cruikshank, D.P., Sugita, S., Matsui, T., Zare, R.N., Laboratory Experiments of Titan Tholin Formed in Cold Plasma at Various Pressures: Implications for Nitrogen-Containing Polycyclic Aromatic Compounds in Titan Haze, *Icarus*, 168, 344-366, 2004.
16. Khare, B. N.; Wilhite, P.; Quinn, R. C.; Chen, B.; Schingler, R. H.; Tran, B.; **Imanaka, H.;** So, C. R.; Bauschlicher, C. W., Jr.; Meyyappan, M., Functionalization of Carbon Nanotubes by Ammonia Glow-Discharge: Experiments and Modeling, *J. Phys. Chem. B., 108,* 8166-8172, 2004.
17. Khare, B. N., M. Meyyappan, M. H. Moore, P. Wilhite, **H. Imanaka** and B. Chen, Proton Irrdiation of Carbon Nanotubes, *Nano letters* 2, 643-646, 2003.
18. Khare, B. N., Bakes, E.L.O., **Imanaka, H.**, McKay, C.P., Cruikshank, D.P. and Arakawa, E., Analysis of the Time Dependent Chemical Evolution of Titan Haze Tholin, *Icarus*, 160, 172-182, 2002.
19. Khare, B. N., M. Meyyappan, J. Kralj, P. Wilhite, M. Sisay, **H. Imanaka**, J. Koehne and C. W. Baushchlicher, Jr., A glow-discharge approach for functionalization of carbon nanotubes, *Applied Physics Letter*, 81, 5237—5239, 2002.

Invited Conference Talks:

- Goldshmidt 2012/6, "Chemical nature of Titan's organic aerosols; constraints from spectroscopic and mass spectrometric observations".
- Committee on Space Research (COSPAR), 38th Scientific Assembly, Bremen, Germany, 2010/7, "The nature and possible roles of larger organic molecules in the atmosphere of Titan".
- International Symposium on Origins of Life and Astrobiology (ISOLAB'05), Niigata, Japan, 2005/7, "Titan: Organic Chemical Laboratory in Planetary Environment".
- Committee on Space Research (COSPAR), 35th Scientific Assembly, Paris, France, 2004/7, "Tholins as coloring agents on solar system bodies".

Other Conference Talks:

- 2012 American Geophysical Union, Fall Meeting, San Francisco, CA, 2012/12
- American Astronomical Society - 44th Division of Planetary Sciences Meeting, Reno, NV, 2012/10
- American Astronomical Society - 40th Division of Planetary Sciences Meeting, Ithaca, NY, 2008/10
- Astrobiology Conference, Santa Clara, CA, 2008/4.
- Astrobiology Conference, Washington D.C., 2006/3.
- American Astronomical Society - 37th Division of Planetary Sciences Meeting, Cambridge, UK, 2005/9.
- American Astronomical Society - 35th Division of Planetary Sciences Meeting, Monterey, CA, 2003/9.
- NASA Astrobiology General Meeting, Tempe, AZ, 2003/2.