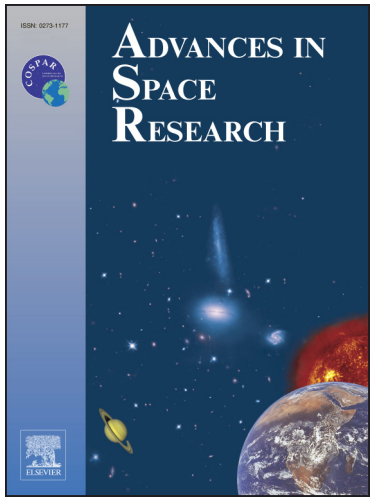

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PII: S0273-1177(16)30163-6
DOI: http://dx.doi.org/10.1016/j.asr.2016.04.028
Reference: JASR 12713

To appear in: *Advances in Space Research*

Received Date: 23 January 2016
Revised Date: 10 April 2016
Accepted Date: 27 April 2016

Please cite this article as: Methikkalam, R.R.J., Pavithraa, S., Murali Babu, S.P., Hill, H., Sekhar, R., Pradeep, T., Sivaraman, B., Thio Residue from Thermal Processing of Cometary Ices Containing Carbon disulfide and Ammonia, *Advances in Space Research* (2016), doi: http://dx.doi.org/10.1016/j.asr.2016.04.028

Thio Residue from Thermal Processing of Cometary Ices Containing Carbon disulfide and Ammonia

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Abstract

We have carried out experimental investigation on binary ice mixture containing carbon disulfide (CS_2) and ammonia (NH_3) ices formed at 10 K. Icy films were formed in various combinations to investigate the reactivity of CS_2 and NH_3 molecules on cometary nucleus. In the case of NH_3 ices, deposition carried out at 10 K was found to contain NH_3 homo-dimers that was found to reorient upon annealing to 40 K. Phase transition was found to take place as the 10 K ice was warmed to higher temperatures and the phase transition temperature was found to be 5 K higher for the mixed ice in comparison to the layered deposits. Thermal processing of the mixed deposition of CS_2-NH_3 ice was found to leave thio residue, which could be ammonium dithiocarbamate that was even found to be present at 340 K.

Keywords: Astrochemistry, methods: laboratory: solid state, ISM: molecules, comets: general, infrared: general

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