

## Interstellar Formation Processes: Is Thermodynamics the Key?

### Content

This study reports the first extensive investigation of the relationship; enthalpy of formation, stability and abundance (ESA) existing among interstellar molecules using high level quantum chemical calculations. Hundreds of molecules comprising of different isomeric groups, several interstellar carbon chains and various protonated species have been considered. From the results, it is evident that molecules with lower enthalpies of formation are more easily observed in the interstellar medium compared to their counterparts with higher enthalpies of formation which implies that the lower the enthalpy of formation, the more stable the molecule, and the higher the stability of a molecule, the higher its abundance in the interstellar medium which makes it easy for the astronomical observation of such molecule. Available data in literature confirm the high abundance of the most stable molecules over their less stable analogues in the different groups considered. This presentation will highlight some of the immediate impacts of this study in addressing some of the whys and wherefores in interstellar chemistry. The few exceptions encountered are well rationalized on the bases of interstellar hydrogen bonding, different formation routes, and sensitivity of current astronomical instruments.

Reference: Etim, E. E., & Arunan, E. Submitted.

**Primary author(s) :** Mr. ETIM, emmanuel (Indian Institute of Science Bangalore)

**Co-author(s) :** Prof. ARUNAN, Elangannan (Indian Institute of Science, Bangalore.)

**Presenter(s) :** Mr. ETIM, emmanuel (Indian Institute of Science Bangalore)

**Session Classification :** Poster Viewing

**Track Classification :** Poster session