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Ultrahigh-resolving analytics in meteoritic soluble organic matter

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The molecular diversity of non-terrestrial organic matter in carbonaceous chondrites was studied by means of both, targeted [1] and non-targeted [2,3] analytical methodologies. Ultrahigh-resolving analytics, like FT-ICR-MS, represent a powerful tool to allow insights into the holistic complex compositional space to likely millions of diverse structures [2], and suggests that interstellar chemistry is extremely active and rich. We described that heteroatomic organic molecules play an important role in the description of non-terrestrial chemical evolution. The thermally and shock-stressed Chelyabinsk (LL5) [4] showed high number of nitrogen counts within CHNO molecular formulas, especially in the melt region. The resulted extreme richness in chemical diversity offers information on the meteoritic parent body history and help in expanding our knowledge or astrochemistry towards higher molecular masses and complex molecular structures.

[1] Pizzarello et al. PNAS 110, 15614–15619. [2] Schmitt-Kopplin et al. PNAS 107, 2763–2768. [3] Hertkorn et al. Mag Res Chem, 53, 754–768. [4] Popova et al. Science, 342, 1069–1073.

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