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Murchison Chondrite

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MURCHISON CHONDRITE

What Meteorites Tell Us About Organic Matter In The Space

History

Murchison Chondrite is a carbonaceous meteorite that fell in a small town called Murchison in Victoria, Australia on September 28,1969. It is believed to be one of the most primitive meteorites fell on Earth. It has been the subject of many scientific publications. More than any other meteorite[1].

http://pl.wikipedia.org/wiki/Plik:Murchison_crop.jpg

Amino Acids

- More than 66 amino acids where identified.
- 8 of them resembled amino acids in the Earth.
- The other 58 are unknown and used only by fungi and bacteria
- Some have a chiral structure while others have an achiral structure.
- It is believed that amino acids in space where synthesized through non-biological processes[3].

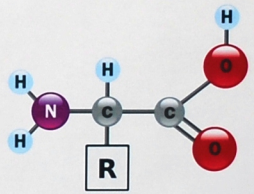
Even though amino acids found in Murchison are not biotic. It is believed they are the primitive precursors of terrestrial amino acids[3].

Organic Compounds found in Murchison

- Amino Acids
- Carboxylic Acids
- Aromatic Hydrocarbons
- Nitrogen heterocyclics
- Sulfonic and phosphoric acids
- Amines
- Amides
- Alcohols
- Aldehydes and ketones
- And sugar related compounds[2]

Two simple structural types of amino acids were identified in Murchison: monoamino monocarboxylic acids and monoamino dicarboxylic acids. There are also two variations on these structural types occur: n-alkyl secondary amino acids and cyclic secondary amino acids[3].

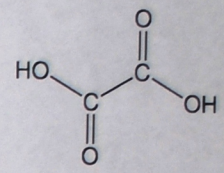
Molecular Structure of Terrestrial Amino Acids



http://en.wikipedia.org/wiki/File:AminoAcidball.svg

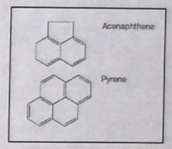
Other organic compound found in Murchison

Dicarboxylic acids

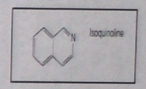


Other Organic Compounds

Aromatic Hydrocarbons



Nitrogen Heterocycles



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Methane: Another important compound found in the space

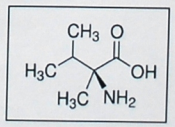
- Methane is found everywhere in the space, and Murchison is not the exception. Because of this, it is believed that everything in the space had a common origin, and that methane survived the constant changes that occurred in the universe.
- Spatial methane is more deuterated than methane found in the Earth.
- It represented 0.016% of the solvent soluble organic compounds found in Murchison[4].

As it can be seen

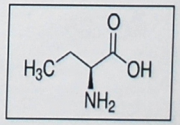
Amino acids found in Murchison differ in structure from amino acids in Earth. While the carbon atom in the carboxylic acid and amino group of biological terrestrial amino acids have a hydrogen atom attached to it, the Murchison's amino acids have a methyl group instead[3].

Molecular Structure of some Amino acids found in Murchison

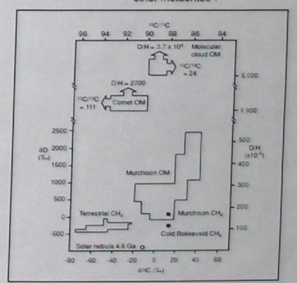
- Chiral



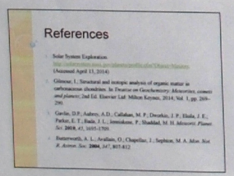
- Achiral



The Combined C and H stable isotopic composition from Murchison and other meteorites[4].



References



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