NATURE OF REDUCED CARBON IN MARTIAN METEORITES. E.K. Gibson, Jr.[1], D.S. McKay[1], K. L. Thomas-Keprta[2], S. J. Clemett[2], and L.M. White[3]. [1]ARES, NASA/Johnson Space Center, Mail Code KA, Houston, TX 77058, [2]ESCG at NASA/JSC, Mail Code JE23, Houston, TX 77058, [3]Dept. Chemistry and Biochemistry, Univ. of California, Santa Barbara, CA 91107.
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Martian meteorites provide important information on the nature of reduced carbon components present on Mars throughout its history. The first *in situ* analyses for carbon on the surface of Mars by the Viking landers yielded disappointing results. With the recognition of Martian meteorites on Earth, investigations have shown carbon-bearing phases exist on Mars. Studies have yielded presence of reduced carbon, carbonates and "inferred" graphitic carbon phases. Samples ranging in age from the first ~4 Ga of Mars history [e.g. ALH84001] to nakhlites with a crystallization age of 1.3 Ga [e.g. Nakhla] with aqueous alteration processes occurring 0.5-0.7 Ga after crystallizaton. Shergottites demonstrate formation ages around 165-500 Ma with younger aqueous alterations events. Only a limited number of the Martian meteorites do not show evidence of significance terrestrial alterations. Selected areas within ALH84001, Nakhla, Yamato 000593 and possibly Tissint are suitable for study of their indigenous reduced carbon-bearing phases.

Nakhla possesses discrete, well-defined carbonaceous phases present within iddingsite alteration zones. Based upon both isotopic measurements and analysis of Nakhla's organic phases the presence of pre-terrestrial organics is now recognized. The reduced carbon-bearing phases appear to have been deposited during preterrestrial aqueous alteration events that produced clays. In addition, the microcrystalline layers of Nakhla's iddingsite have discrete units of salt crystals suggestive of evaporation processes.

While we can only speculate on the origin of these unique carbonaceous structures, we note that the significance of such observations is that it may allow us to understand the role of Martian carbon as seen in the Martian meteorites with obvious implications for astrobiology and the pre-biotic evolution of Mars. In any case, our observations strongly suggest that reduced organic carbon exists as micrometer-size, discrete structures on Mars associated with clay and salt minerals. The Mars Science Laboratory's investigators should be aware of reduced organic carbon components within clay-bearing phases.

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