



## **Wet Chemistry Experiment at Mars (WetChem)**

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NASA is developing strategies for several in-situ missions to Mars in the next few decades to explore and quantitatively assess potential habitability on Mars. Some of these missions will be designed to specifically search for biosignatures on Mars. In order to analyze inorganic and organic compounds from Martian surface and sub-surface samples, and to search for biosignatures on Mars, we propose a novel experimental approach utilizing wet chemistry combined with mass spectroscopy called "Wet Chemistry Experiment at Mars (WetChem)". WetChem consists of an integrated suite of miniature instruments: Robotic Chemistry Analysis Laboratory (RCAL), Electrospray Ionization/Ion Mobility spectrometer (ESI/IMS) in tandem with a Cylindrical Ion Trap Mass Spectrometer (CIT-MS).

RCAL is designed to provide information on bulk salt content, characterize salts and minerals that are present in Martian soil using array of electrochemical sensors. The sensor array consists mainly of potentiometric ion selective electrodes but also includes conductivity, and voltammetric microelectrodes for determination of heavy metals. In addition, RCAL will serve as the front-end instrument to extract volatiles, inorganic and organic compounds from Martian regolith to be fed to ESI unit for further analysis of the samples by IMS/CIT-MS. More specifically, we will conduct a broad survey of types and abundance of carbon containing molecules including complex organic molecules and identify potential chemical biosignatures (i.e. amino acids, carboxylic acid) in solid phase materials using IMS/CIT-MS system.