



Prioritized Technology: Technologies to Extract and Process Materials on Ocean Worlds for Life Detection

Technical Goal

- Extract potential Biomarkers and signatures; e.g., amino acids, lipids, hopanoids, biopolymers, cells from water-ice/inorganic matrices (e.g., salts/silicates), regolith or aerosols.
- Process extracted Biomarkers for detection; E.g., desalinate, concentrate, buffer, derivatize, lyse, amplify and detect.
- Increase sample extraction and processing efficiency;

Note: Specific technical **requirements** on sample size, concentrations etc. will be detection method/instrument specific.

Technical Status/ SOA

- **Thermal Extraction "dry" & "wet - organic" w/derivatization**
Sample Analysis at Mars (SAM)-MSL; w/hydrocarbon trap (or direct evolved gas analysis); GCMS interface
- **Laser Desorption**
MOMA ExoMars
- **Solvent Extraction (Organic)**
Interfaced with Liquid Chromatography (PICASSO; STMD Early Career Fellowship)
- **Solvent Extraction (Aqueous)**
MatISEE /PICASSO/ICEE-2/ COLDTech Programs
- **Solvent Extraction (Carbon Dioxide)**
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Mission Applications

- Release of biomarkers from their natural matrices will facilitate their identification.
- Determining extraction efficiencies under native conditions will enable determination of abundance of biomarkers in matrix.
- Quantitative isolation, concentration, and amplification expands the capability to detect biomarkers.