SwarnaJayanti Fellow to work on Metal CO_2 battery which can reduce payload mass & launch costs of planetary missions

India's planetary missions like Mars Mission may soon be able to reduce of payload mass and launch costs with the help of an indigenously developed Metal- CO_2 battery with CO_2 as an Energy Carrier.

Chandra Shekhar Sharma, Associate Professor from Department of Chemical Engineering, IIT Hyderabad and a recipient of this year's Swarnajayanti fellowship instituted by the Department of Science & Technology (DST), Government of India, will be working to develop Scientific Understanding and Technical Development of Metal- CO_2 battery with CO_2 as an Energy Carrier for India's Mars Mission.

Prof Sharma recently demonstrated the technical feasibility of Lithium- CO_2 battery in simulated Mars atmosphere for the first time. This study was published in the journal ***Elsevier's Materials Letters,*** and an Indian patent has been filed for it. As a part of the Swarnajayanti Fellowship, he aims to develop a working prototype of Metal (M)-CO_2 battery technology and explore the feasibility of this technology in the Mars mission, particularly for the surface landers and rovers by using the CO_2 gas which is abundantly available in its atmosphere. The development of Metal-CO_2 batteries will provide highly specific energy density with the reduction in mass and volume, which will reduce payload mass and launch cost of planetary missions.

Another parallel aspect of this research is to develop Metal-CO_2 battery technology also as a promising clean strategy for restraining the climate effects of CO_2 emissions. Metal-CO_2 batteries have a great potential to offer significantly high energy density than the currently used Li-ion batteries and provide a useful solution to fix CO_2 emissions, which is better than energy-intensive traditional CO_2 fixation methods.

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