

Contribution ID: 32

Type: **not specified**

Machine learning for optimizing plasma resource utilization in Mars

Thursday 9 February 2023 09:45 (15 minutes)

Plasma technologies for *in situ* resource utilization on Mars have been proposed recently, in particular to decompose CO₂ from the Martian atmosphere and extract the oxygen for life-support, fuels and agriculture. However, the underlying plasma chemistry is very complex and efficient prediction of the plasma properties is mandatory. Moreover, some of the reaction constants of the plasma are not yet well determined or have a significant uncertainty associated. The goal of this research is to use machine learning to predict and optimize the set of rate coefficients used in the reaction schemes that describe CO₂ conversion on Mars. An artificial neural network will be trained to learn and optimize the rate coefficients of the reactions given a set of plasma parameters that can be measured experimentally. Furthermore, it is pretended to provide an estimate of confidence for the model output and identify the most relevant features of the reaction set, eliminating minor species and less important elementary processes.

Author: RODRIGUES GONÇALVES, Marcelo

Presenter: RODRIGUES GONÇALVES, Marcelo