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**A validation study on $CO_2$ chemistry** PETER KOELMAN, Eindhoven University of Technology, STIJN HEIJKERS, Antwerp University, SAMANEH TADAYON MUSAVI, Eindhoven University of Technology, WOUTER GRAEF, Plasma Matters, ANNEMIE BOGAERTS, Antwerp University, JAN DIJK, VAN, Eindhoven University of Technology, ELEMENTARY PROCESSES IN GAS DISCHARGES TEAM, PLASMANT TEAM — The demand for renewable energy has increased the popularity of various energy sources, such as solar and wind energy. These sources are intermittent by nature, which typically does not match the demand of energy. Therefore, storage of energy is needed. Current tools for this are, however, costly, slow, and inefficient. Storing energy by the formation of valuable fuels from $CO_2$ is potentially an improvement. By plasma assisted $CO_2$ dissociation CO is produced. In subsequent steps the CO is transformed in valuable fuels. An extensive $CO_2$ microwave plasma chemistry is studied, with special attention to the vibrational modes, which provide a pathway for the dissociation. To that end we developed a global model, which is only time resolved and needs less computational time than spatially resolved models. We present the results from a verification study of the $CO_2$ chemistry. This is done by verification of input data, and by comparison of results obtained by two independent models: ZDPlaskin and PLASIMO's Global Model. We also present results from a sensitivity study of the input data.

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