## A Robust Theoretical Elastoplastic Continuum Damage T-H-M Model for Rock Surrounding a Wellbore

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**Abstract :** Injection of CO2 inside wellbore can induce different kind of loadings that can lead to thermal, hydraulic, and mechanical changes on the surrounding rock. A dual-porosity theoretical constitutive model will be presented for the stability analysis of the wellbore during CO2 injection. An elastoplastic damage response will be considered. A bounding yield surface will be presented considering damage effects on sandstone. The main target of the research paper is to present a theoretical constitutive model that can help industries to safely store CO2 in geological rock formations and forecast any changes on the surrounding rock of the wellbore. The fully coupled elasto-plastic damage Thermo-Hydraulic-Mechanical theoretical model will be validated from existing experimental data for sandstone after simulating some scenarios by using FEM on MATLAB software.

Keywords : carbon capture and storage, rock mechanics, THM effects on rock, constitutive model Conference Title : ICRMRS 2020 : International Conference on Rock Mechanics and Rock Structure Conference Location : Prague, Czechia Conference Dates : July 09-10, 2020