



UNIVERSITÀ DEGLI STUDI  
DI TRENTO

Dipartimento di Ingegneria Civile,  
Ambientale e Meccanica



Mechanics of refractory  
materials at high-temperature  
for advanced industrial  
technologies  
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## AVVISO DI SEMINARIO

Si comunica che **il giorno 30 ottobre a partire dalle ore 16.00**  
presso l'aula **P1** (via Mesiano 77) si terrà il seguente seminario

### **Thermo-mechanical issues in Steam-Assisted-Gravity-Drainage (SAGD) Prof. BENJAMIN LORET**

Laboratoire Sols, Solides, Structures  
Grenoble, France

Recovery of heavy oil in shallow layers faces a number of technical issues to become economical. The high viscosity of oil and its wettability are key players. The method referred to as Steam-Assisted-Gravity-Drainage (SAGD) uses pairs of horizontal wells, the upper one for steam injection, the lower one for oil production. Steam diffuses upwards and condensates, releasing heat which is used to decrease oil viscosity.

A mechanical description of the process has to consider, at minimum, a solid and three fluid constituents, namely oil, water and steam. The significant change of temperature in the steam chamber induced by the process, from about 20°C to 250°C, gives rise to large horizontal stresses, of the order of 10 MPa, which in turn imply plastic dilation and possibly fractures. The ensuing increases in hydraulic conductivities, which are favorable for the oil recovery, should be included in a model. A proper description of the relative saturations of the three fluids in terms of their individual pressures is another key ingredient that controls the relative permeabilities. Additional phenomena, like gas dissolution, may play a significant role.

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