Drying of solid hydrates

Hydrates are rigid porous products characterized by hygroscopicity induced by water that is bound chemically, not physically. Experiments have demonstrated that the physicochemical characteristics of these media give rise to unique thermal and mass behaviors during drying that transport models are unable to predict:

- · Appearance of stages in the water content profiles corresponding to the different hydration states.
- Appearance of plateaus in temperature kinetics.

The major difficulty lay in taking into account the discontinuous desorption isotherms and introducing dehydration energies into the energy continuity equation.

This issue had been previously studied by the laboratory and was re-examined in the light of works devoted to the chemical reaction. The theoretical solution is to consider each hydration state as a distinct phase, in which case each dehydration process is a heterogeneous chemical reaction.