
KAIST CBE Special Seminar

- **Speaker:** Prof. Sangyong Lee
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- **Title:** Thermodynamic modeling of Gas Hydrates
- **Date/Time:** 10 June, 2014 (Tue) 1:30-2:30PM
- **Place:** #1101 @ W1-3 Bldg.
- **Contact:** Serim Kim (X3902)

Abstract:

Gas hydrates are non-stoichiometric crystalline compounds formed by the physical combination of water and low molecular weight gases such as hydrogen, methane, and propane. In gas hydrates, gas molecules are physically encaged in cavities in the lattice structure formed by the water molecules. They can be formed at low temperature and high-pressure conditions such as ocean sediment and arctic permafrost regions. According to the prediction of US Geological Survey, total amount of gas hydrates reserved on earth is about 10,000 gigatons. The importance of gas hydrate research is increasing not only because of the possibility of gas hydrate being used as a future energy source but also because of being used as a new gas storage medium (hydrogen or natural gas storage) and a new gas separation method. In the presentation, a new molecular based thermodynamic model to predict the equilibrium condition of gas hydrate will be introduced. A thermodynamic model was developed based on the distortion assumption. This model can predict the equilibrium condition of gas hydrate less than 10% error for single component gas hydrates and less than 15% of mixture gas hydrates in the wide temperature range. It was applied to predict the equilibrium condition of hydrogen gas hydrate, and gas hydrates in the sediment with the various contact angle models and a pore size distribution function. A new thermodynamic model can be applied to develop a new gas storage method (natural gas or hydrogen), and to develop a new separation technique. Accurate prediction of the dissociation condition of gas hydrate in sediments would give us the information about the proper operating condition to harvest natural gas from hydrate deposit.

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