

3rd International Conference on

Materials Science and Engineering

October 07-08, 2019 | Frankfurt, Germany

Impacts of entropic separation effects

Alexander von Wedelstedt

HTW University of Applied Sciences, Germany

One of the fundamental challenges of our time is to mitigate the effects of climate change and to strive for a responsible handling of resources and raw materials. In order to reach those goals, industrial processes need to be altered as well. This development must, among other things, aim to replace unsustainable by eco-friendly methods. One such example would be the replacement of unsustainable processes like distillation to separate hydrocarbons by adsorption methods. Due to their high surface-to-volume ratio and the wide range of possibilities to design and modify the pore environment, metal-organic frameworks are appropriate candidates to conduct highly efficient adsorption processes to separate hydrocarbons. However, for a broad industrial application, comprehensive knowledge of separation effects and the behaviour of guest molecules

within the channels of metal-organic frameworks is needed.

Besides the well-known separation mechanisms, based on enthalpic, kinetic or steric (i.e., sieving) differences, there is a further mechanism based on entropic effects, which seems to be virtually unknown and is, hence, often ignored. Those entropic effects describe the efficiency with which guest molecules can arrange themselves inside the channels of nanoporous materials. Due to the remarkable selectivities that can be reached through entropic separations, they are of particular interest. The aim of this presentation is to give a short outline of entropic separation effects and to present individual results of the entropic separation of hydrocarbons obtained by Monte Carlo simulations.

e: alexandar.vonwedelstedt@htw-dresden.de