

Adsorption und phase equilibria: completely without diffusion?

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If diffusion processes at interfaces are studied, adsorption can never be neglected. However, if adsorption at interfaces is studied, diffusion processes can absolutely be neglected – namely if we consider thermodynamic equilibrium states.

This is the pure theory. The question is to what extent the thermodynamic equilibrium is reached, especially as we know that the so-called “equilibrium state” is an abstracted idealized state allowing us to apply our theories for describing nature in a much simpler manner.

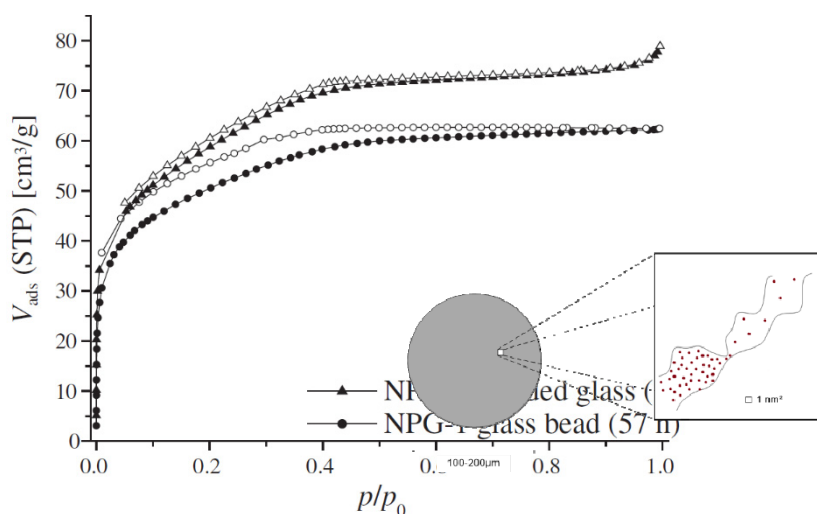


Figure 8: Nitrogen adsorption at 77 K on NPG-1 nanoporous glass beads (dots) and grinded NPG-1 nanoporous glass (triangles) with different measurement time (filled symbols: adsorption, empty symbols: desorption) [1].

In this work, we will present experimental and theoretical results concerning adsorption und phase equilibria being influenced by kinetic effects. This concerns experimental gas adsorption in nanoporous glasses with bottlenecks [1], carbonaceous adsorbents [2] or MOFs [3] as well as

calculations from gas adsorption isotherms [4] or liquid-vapor and liquid-liquid equilibria [5]. Additionally, recently built-up devices in our laboratory for measuring immersion enthalpies and the adsorption of liquid mixtures on porous solids by allowing to track the equilibrium time are shown.

References

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