Discovery, Invention, Innovation – 40 years in Microporous Materials

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Over a period of about 75 years in both industrial and academic research a vast majority of porous carbon, silica, zeolites, metal organic frameworks were detected. In addition, several tenths of thousands are theoretically predicted. Surface areas of porous materials - as one of descriptors of properties - meanwhile have increased about 20-fold.

Ironically, only less than a double digit cases of solids structures paved its way from discovery into invention and innovation (ion-exchange, adsorption, catalysis...).

The talk aims at outlining drivers - basics as well as key factors - being necessary to successfully propel ideas and observations into value generating commercialization. Technology drivers like social demand, technology push, market pull will be discussed, and the term innovation will be quantified. Examples are given referring to refinery, chemical and environmental applications of a few zeolites, e.g. BEA, MFI, FAU, CHA and a limited number of MOFs. It will be critically questioned what we need in future to accelerate development and how to increase the success rate beyond our current ~ 5%.

Finally, it will be challenged which major projects should be tackled in near future and posing the question which role microporous materials can play, e.g. in reducing 420 ppm of carbon dioxide in our atmosphere.

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(S. Fuhrmann, 1611)