A new approach to the mechanism for the acetalization of benzaldehyde over MOF catalysts

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Abstract
The benzaldehyde acetalization reaction catalyzed by UiO-66, and its fluorinated analog UiO-66F, was carried out in a batch-type reactor at room temperature and atmospheric pressure, and the full kinetic study was performed using the Langmuir-Hinshelwood and Eley-Rideal models. It was established that the Eley-Rideal model is the one that best fits the experimental data. The catalytic results indicated that both MOFs enable carrying out the acetalization reaction. However, UiO-66F has the highest activity, which could be attributed to its high acidity. Both structures were characterized by N_2physisorption, thermogravimetry, powder X-ray diffraction, potentiometric titrations, and infrared spectroscopy. The highest acidity displayed by UiO-66F was explained by DFT studies and experimental studies.

Indexed keywords
Engineering controlled terms:
Atmospheric pressure
Infrared spectroscopy
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Engineering uncontrolled terms
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