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AREA OF EXPERTISE:	Porous materials: synthesis and characterization
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DISSERTATION TITLE:	Controlling the morphology of zeolite crystals in OFF and MTT/TON systems

Zeolitter er porøse, krystallinske materialer som benyttes i utstrakt grad som katalysatorer i den kjemisk industrien. I dette doktorgradsarbeidet har det blitt undersøkt hvordan zeolittenes egenskaper som katalysator kan kontrolleres ved å endre krystallenes fasong under fremstillingen. Dette nybrottsarbeidet gir kjemikere et helt nytt spillerom for å utvikle nye kjemiske prosesser og for å forbedre og optimalisere de eksisterende.

Catalysis is the mainstay of chemical industrial processes and at the heart of these processes, catalysts play a crucial role. This thesis is centred around the synthesis of crystalline zeolite catalysts and an understanding of the relationship between their crystal morphology and the catalytic performance. Zeolites are fascinating inorganic materials with crystalline structures and well-defined channels that match the dimensions of small molecules allowing for size-based discrimination on the molecular level. This is one of the properties which contributes to the application of zeolites as shape-selective catalysts in the Methanol-To-Hydrocarbons reaction (MTH).

The results obtained have shown that appropriate modifications in the crystal shape of zeolites can have a major impact on the catalyst performance. For catalysts that possess pores with differently sized openings exposed on distinct crystal surface facets, as is the case for the studied zeolite Offretite, it is possible to tune the product selectivity in the MTH process. In this doctoral work, the correlation between crystal shape and catalytic lifetime has been demonstrated and discussed also for zeolites ZSM-23 and ZSM-22, which are potential candidates for the production of aromatics-free gasoline.

A researcher who decides to explore the exciting world of zeolites and master the art of synthesis will probably face one of the major problems in the field: poor reproducibility. The necessity of a tool, which can provide standardization and bridge the gap between scientists trying to reproduce the zeolite syntheses of other researchers was the motivation behind the development of the Batch Calculator

software tool. Batch Calculator increases experimental rigor and reporting transparency, and hopefully it will become a standard tool widely accepted by the zeolite community.