

## סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד' 17.11.21  
(י"ג בכסלו, תשפ"ב), בשעה 13:00 באמצעות הזום : <https://technion.zoom.us/j/98955606455>

**מרצה :** נתנאל קדוש

**מנחה :** פרופ' ערן שר

**על הנושא :**

### **INVESTIGATION OF THE PERFORMANCE CHARACTERISTICS OF A CYLINDRICAL CATALYST IN THE PROCESS OF STEAM REFORMING**

The seminar will be given in Hebrew

**תקציר ההרצאה :**

Methanol can be reformed with steam as a hydrogen carrier in the presence of Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> catalyst. A complete pseudo-homogenous model of a packed-bed reformer has been developed in this research, to investigate the influence of the operating conditions and the geometric parameters on its performance. Kinetic Langmuir-Hinshelwood model was chosen to describe the process along the reactor including pressure drop, mass and heat transfer phenomena. The Kinetic Langmuir model's predictions were compared with the values obtained experimentally at different temperatures and pressures, and the experimental values validated the model predictions.

As part of this work, a miniaturized methanol reactor was designed and analysed at a wide range of temperatures and pressures to define the required parameters for maximum hydrogen output. Simulations were performed using MATLAB to study the process parameters effects. Mass and energy balance equations were derived for each component in the reactor. Effectiveness of the catalyst was calculated for a wide range of catalyst particle sizes and the Ergun equation was used to model the pressure drop. It was found that the pressure drop is negligible for a range of catalyst particle sizes. A suitable reactor and an evaporator were designed to oxidize methanol to produce sufficient heat for the steam reforming reactions. Based on the calculation of methanol flow, at non-isothermal conditions, sufficient heat is generated to complete the conversion of methanol.

בברכה,

פרופ' נח אתי סאס  
מרכז הסמינרים