SEMINAR - סמינר

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום א׳ 3.02.2019
(כח׳ בשבט, תשע״ט), בניין ליידי דייויס, אודיטוריום 250, 30 :14.

מרצה:

Dr. Maarten Biesheuvel

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על הנושא:

Physics-based modeling of pressure-driven and current-driven water desalination

The seminar will be given in English

להלן תקציר ההרצאה:

Water can be desalinated in many ways, some more classical, some more novel. I will discuss several interesting aspects of the theoretical modeling of water desalination by pressure (reverse osmosis and nanofiltration) and current (electrodialysis and capacitive deionization) making use of continuum (mean field) theories. Going beyond the Boltzmann level, important questions are how to include ion volume effects and acid-base reactions between ions and with solid materials. Indeed, the dependence of surface charge on local pH is a of relevance both in membrane transport and in porous electrodes. The acid-base reactions between ions, such as hydroxyl ions, hydronium ions, the various carbonate species, and other ions that exist in multiple states, such as ammonium or boron, often need to be included to describe the propensity for scaling, and to predict pH changes. To do this balances over "groups" of species must be set up. An interesting question is whether a H-balance is an appropriate tool in these cases. These balances can be combined with local acid-base chemical equilibrium resulting in a robust and elegant numerical code. These topics are of significant relevance for the correct modeling of ion selectivity in desalination. For nanofiltration, with pores of at least a few nm in diameter, charge regulation has led to lively debate about the existence of a limiting law in the conductance of carbon nanotubes of order 1/3 or 1/2. We finally discuss heat effects both in pressure-driven flow and current-driven flow, where classical sources and analysis predict local cooling to occur in electrical double layers and membranes.

מארח: פרופ״מ מתיו סאס

בברכה,

פרופ"א מתיו סאס
מרכז הסמינרים