Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה׳ 22.03.2018 (ו׳ בניסן, תשע״ח), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: דור דניאל

מנחה: פרופ׳/ח גלעד יוסיפון

על הנושא:

Enhanced cooling of electronic chips using a combined diamond coating and microfluidics

The seminar will be given in Hebrew

תקציר ההרצאה :

Continued efforts of miniaturizing electronic devices result in increasing the density of heat emitting components. These components are mainly cooled by free or forced air convection. These methods are insufficient for high power chips (~1000W/cm2). The challenge is to effectively spread and dissipate the heat generated by the active areas in order to keep the maximum temperature of the device as low as possible. While many cooling systems have been developed to cope with this challenge, e.g. microchannels, heat sinks, heat pipes etc., the bottleneck is the coupling of the active areas that need to be cooled and the cooling system. A possible solution is coating the Silicon substrate with a layer of diamond via chemical vapor deposition (CVD). This enables the manufacturing of integrated systems consisting of a high power component, a cooling system and a layer of diamond coupling them. The integration of diamond is beneficial due to diamond's unique thermal properties, in particular its high thermal conductivity (around 1500 W/mK). The introduction of a high thermal conductivity layer is an efficient way to spread the heat generated by hot spots or non-uniform heating of electronic devices. In this study we have characterized the thermal response of such systems under varying applied powers and forced flow. Three-dimensional numerical analysis of the system was performed and compared to experimental results. The results show a significant cooling enhancement due to the combination of diamond coating and microfluidics .

בברכה,

פרופ״מ מתי סאסו
מרכז הסמינרים