סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 18.11.2020

(ב׳ בכסלו, תשפ״א), בשעה 13:30 באמצעות הזום :

https://technion.zoom.us/j/94301532378

מרצה: אוראל גואטה

מנחה: פרופ׳ דניאל ריטל

על הנושא:

אפיון ההנחתה של ג׳ל מת׳יל צלולוז מבוסס מים תחת הלם

Shock attenuation characteristic of methyl cellulose hydrogels

The seminar will be given in Hebrew

תקציר ההרצאה :

The research deals with the investigation of the mechanical properties of methyl cellulose hydrogels under static and dynamic loads in order to use it as an impact mitigator for engineering structures, sensitive electronic devices and body organs.
Methyl cellulose (MC) hydrogels are known to undergo thermo-reversible gelation (liquid to solid) upon heating. Unlike most materials, the solidification of MC gels is an endothermic process. The energy for the gelation of MC can be supplied either by heating or, as recently observed, by mechanical impact. When applying mechanical impact on MC, the shock can be absorbed by the endothermic gelation without involving any additional heat supply. Several recent reports have demonstrated an outstanding feature of MC gels in that they can significantly mitigate impact energy, thereby partially shielding engineering structures from the violent initial elastic accelerations inherent to shock loading.
The shock attenuation characteristics of aqueous methylcellulose (MC) gels were characterized experimentally and modelled towards their application in bodily protection systems against traumatic injury. The attenuation of MC gel with 4 different thicknesses and 3 concentrations was measured, using an instrumented (Hopkinson) bar and piezoresistive sensors for direct force sensing on the gel. First, the impulse attenuation was systematically characterized for all combinations of thickness and composition, and the results were analyzed statistically. Then, the frequency attenuation of the gel was analyzed and the frequency response function was estimated. Finally, a non-linear function was then fitted to the experimental impulse attenuation as a function of the thickness and the concentration and a general frequency response function was suggested. Then, a phenomenological expression was developed and validated for the shock attenuation of MC gels as a function of their composition, thickness and spectral content of the shock.

בברכה,

שירה אחי סאס

מרכז הסמינרים