Take Home Exam 04: Contact Angle

Assigned: 09/08/2022

Due (as pdf by email) 09/11/2022 (Sunday)

•you will receive a simple letter grade for your report

•You may submit your answers in one of two ways:

1) For typed answers: as a .docx file (as is) or converted into a pdf file. (DO NOT SEND GOOGLE DOC)

For handwritten answers: Please scan as images, and group together into one pdf file. Or you may hand them manually to my office (ECME-212)

HW 04.1

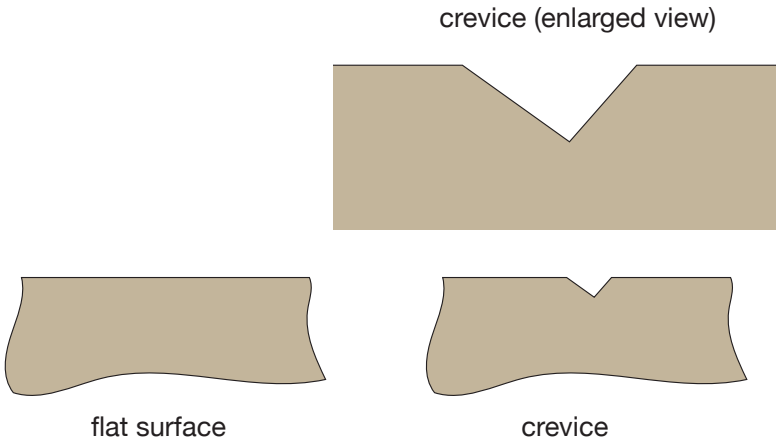
Calculate the size of a critical embryo for homogeneous nucleation if it contains (i) 1000 atoms, and (ii) 10,000 atoms. Give your result as a multiple of the size of the atoms (that is normalized with respect to atom size).

HW 04.2

Derive an equation that gives the number of atoms in an embryo of critical size as a function of the contact angle, normalized with respect to an embryo of a spherical shape, with the same surface radius of curvature. Make a hand sketch of this result as a function of a contact angle.

HW 04.2

It is discovered that nucleation is easier in crevices than on flat surfaces as sketched below



Explain (with a simple sketch) why the crevice is more favorable to nucleation.

(Hint: consider the equilbrium shape of a nucleus)