

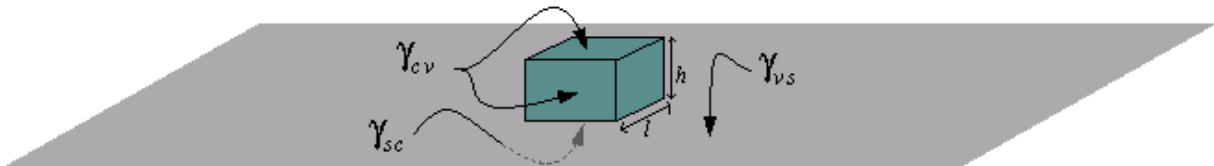
**AMSE502 Phase Transformations**

due Date: May 2, 2023

Problem Set #4

Prof. Byeong-Joo Lee  
calphad@postech.ac.kr  
Room 1- 311

1. The following figure illustrates a nucleation of a completely faceted cubic particle on a flat substrate. Write down an expression for the energy change due to the formation of nuclei in a functional form of its size. Then, find the critical size ( $h^*$ ,  $l^*$ ) and energy barrier of nucleation.



[from MIT lecture note]

2. Read the following two papers and summarize on one A4 paper for each.
  - “Prediction of Interface Reaction Products between Cu and Various Solder Alloys by Thermodynamic Calculation,” Byeong-Joo Lee, N.M. Hwang and H.M. Lee, Acta Materialia, 45, 1867-1874 (1997).
  - “Prediction of Ti/Al<sub>2</sub>O<sub>3</sub> Interface Reaction Products by Diffusion Simulation,” Byeong-Joo Lee, Acta Materialia 45, 3993-3999 (1997).