4. Homework „ Cubic forms. Wulff's theorem".

1. Calculate the angle between the neighboring surfaces of a rhombododecahedron {110} (see Fig. 1).

2. Find the Miller indices for the facets of the following cubic forms (see Figs. 2-3). Calculate the angle between the neighboring surfaces.

3. A cubic crystal growth has started from a seed crystal with the facets {100} and {110} and has a form depicted in Fig. 3. The specific surface energies of the (100) and (110) plane corresponds to σ_1 and σ_2 ($\sigma_1 \neq \sigma_2$), and the distances from the center to facets h_1 and h_2, respectively. According to Wulff's theorem the certain crystal planes are preferred over others due to energy minimization arguments:

$$\frac{\sigma_1}{h_1} = \frac{\sigma_2}{h_2}$$

Define σ_2/σ_1 ratio in order to obtain both surface types in the balance during the crystal growth?
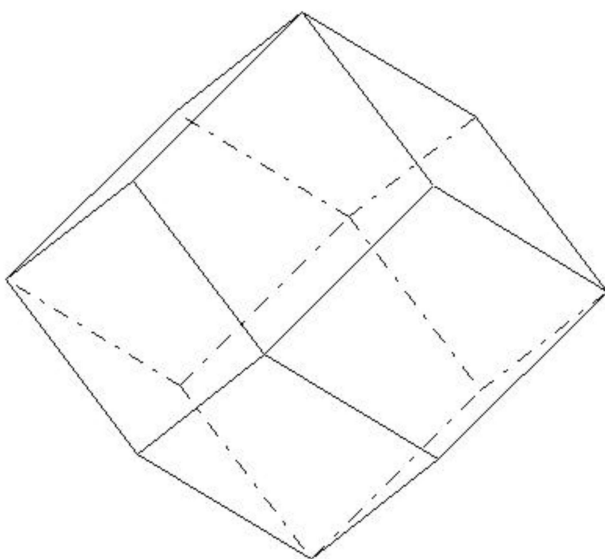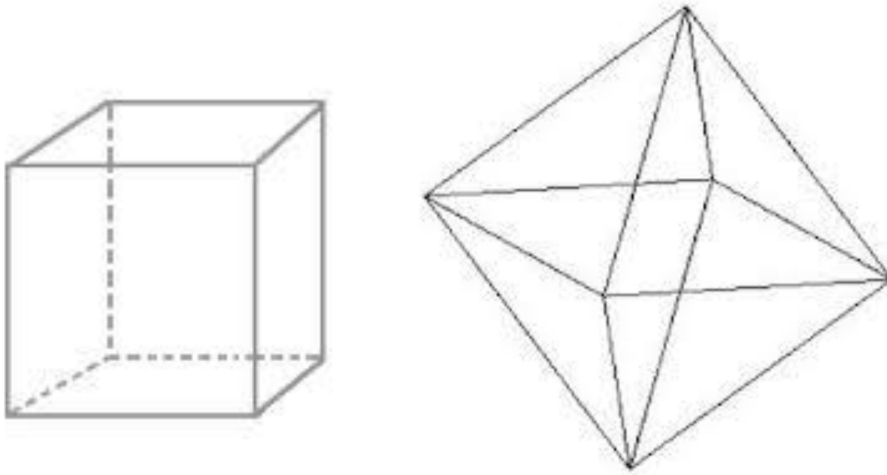
Fig. 1 Rhombododecahedron
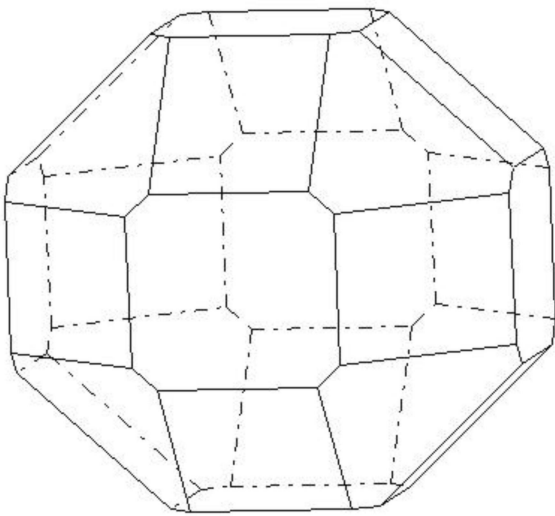

Fig 2. Cubic forms: cube and octahedron

Fig. 3 Cubic form