

# EXERCISE 8

**Exercise 1:** Make a comparative table of advantages/disadvantages of chemical vapor deposition (CVD) techniques vs physical vapor deposition (PVD) techniques. Parameters to compare: sticking coefficient, deposition rate, conformality of the deposition, range of materials that can be deposited, safety, upscaling, typical application in industry.

**Exercise 2:** Read the first two pages of the article "Sheath impedance effects in very high frequency plasma experiments"<sup>1</sup> and answer the following questions:

- a) What did they measure?
- b) What is the advantage of VHF and for which application is it used?

**Exercise 3:**

- a) Using the structure-zone model developed by Thornton (see the article "The microstructure of sputter deposited coatings"<sup>2</sup>), list the main causes of void formation in sputtered thin films during growth.
- b) How can we exploit the oblique deposition during evaporation or sputtering?
- c) What are the advantages of sputtering deposition vs evaporation?

**Remarks:** The papers mentioned above should be provided to you by EPFL e.g. via the homepages [www.isiknowledge.com](http://www.isiknowledge.com), [www.sciencedirect.com](http://www.sciencedirect.com) or directly via the homepages of the publishers. Otherwise you can fetch them from the moodle as well.

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<sup>1</sup>W. Schwarzenbach, A. A. Howling, M. Fivaz et al, J. Vac. Sci. Technol. A **14**, 132 (1996)

<sup>2</sup>J. A. Thornton, J. Vac. Sci. Technol. A **4**, 3059 (1986)