

DC SPUTTERING SYSTEM FOR EDUCATIONAL PURPOSE

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1. Introduction

For use in a future course of Vacuum Technology to be offered as an optional discipline in the Faculty of Science and Technology, FCT, we intend to show, in addition to the traditional deposition systems for thermal evaporation, vacuum pumps, gauges, etc., a sputtering DC deposition system. In view of the technical difficulties for monitoring *in situ* of the parts of each system, was suggested assembling a prototype system from small size [1,2] that allows easy handling by the students, as well as assembly and disassembly even keeping the metal film deposition characteristics.

2. Experimental

Made from a 5" stainless steel tube, this system has all the internal components of a commercial system as cooled water target holder, viewing window and a vacuum system with mechanical pump 5,1 m³/h, Pirani gauge and meter and gas injection assemble. The gas inlet system consists of two MKS mass flow meters, one of 1000 sccm and other of 150 sccm and a Controller. To mount the DC discharge system, we use a transformer with center tap 2KV, so that through a high-voltage bridge rectifier and a capacitors assemble, can be obtained - 2.000V applied to the cathode. A Variac autotransformer is used in the primary of the transformer thereby obtaining a DC regulated voltage output.

3. Results and Discussions

Figure 1 shows the system already mounted. Vacuum tests have been made and we are now making the discharge tests, to form the metal films.



Fig. 1. Image system, showing gas inlet (black hose) and outlet (red orange hose) in addition to part of the Pirani gauge at the cathode.

The system may be completely disassembled, showing in detail each piece, parts of it and operation of this system. The target diameter, 0.5 ", and its exchange facility, allows studying the " yield "and other parameters of sputtering Being a low cost prototype be replicated as necessary; in addition, the size is ideal for pupils handling.

4. References

- [1]- L. Holland "*Vacuum Deposition of Thin Films*" Chapman and Hall; 6TH edition (1966)
- [2]- E.C. Lima; C.A. Guarany e E.B. Araújo, "Construção de um sistema de pulverização catódica DC de baixo custo para deposição de filmes metálicos", *Revista Brasileira de Aplicações de Vácuo*, v. 25, n. 4, 203-208, 2006.

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