

MICROWAVE-ENHANCED THIN-FILM DEPOSITION

SUPERWAVE TECHNOLOGY INC.

S. Chitre

● OBJECTIVE

deposition of semiconducting and insulating thin films at low temperature using microwave technology.

● BACKGROUND

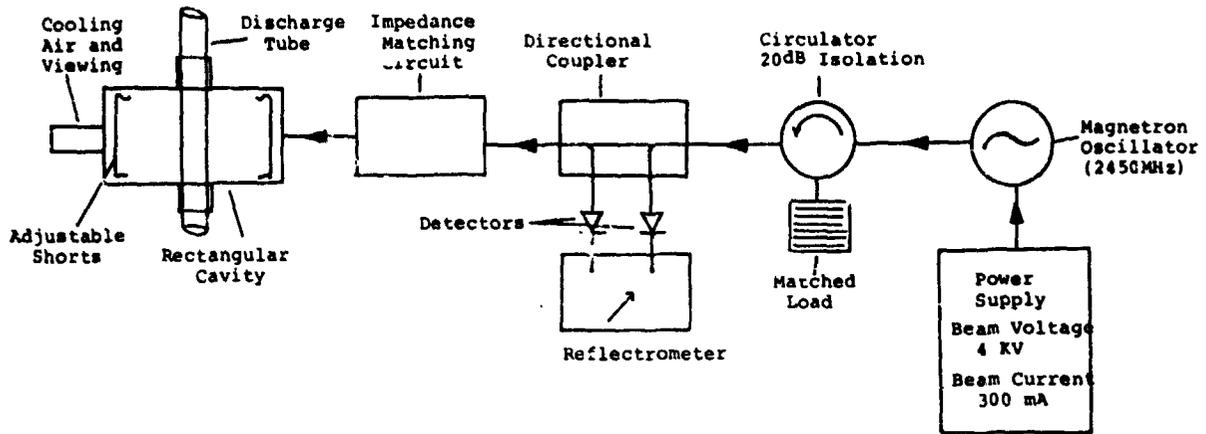
1. Microwave plasma research began early 60's.
2. Microwave excitation:
 - a. used to promote variety of chemical reactions
 - b. offers more dense and longer lived active species (leads to separation of deposition chamber from discharge zone, eliminating harmful influences on samples due to direct exposure to plasma)
 - c. Offers good uniformity & reproducibility (substrates kept at low temps.)
 - d. endpoint detection & plasma diagnostics done with ease & accuracy

● APPROACH

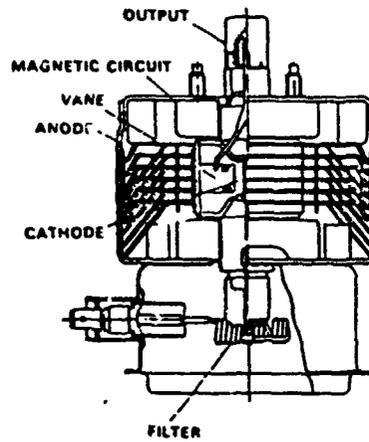
1. Method of plasma formation
2. System consideration
 - a. selecting a power source
 - b. design of the microwave plasma cavity
 - c. microwave circuitry
 - d. impedance matching
 - e. plasma diagnostics
 - f. deposition chamber
 - g. vacuum system

PROCESS DEVELOPMENT

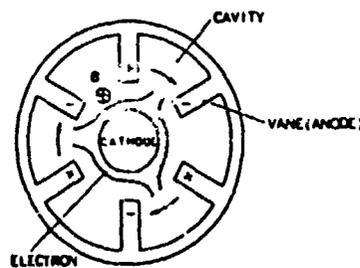
Microwave Plasma Cavity and Associated Circuitry



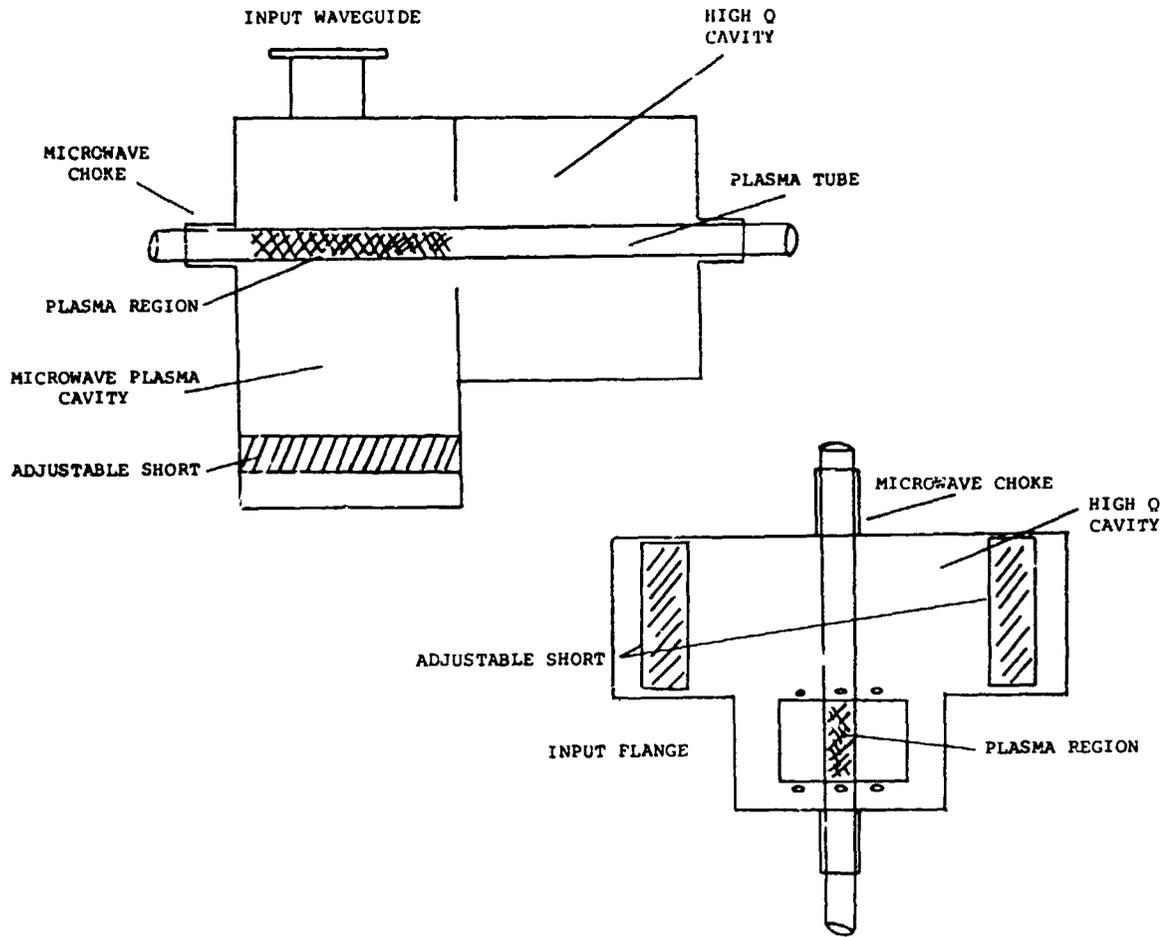
Structure of Magnetron



Principle of Magnetron Oscillation



Construction of Microwave Plasma Cavity



Elements of Microwave Deposition System

