

# A PLASMA POLYMERIZATION INVESTIGATION AND LOW TEMPERATURE CASCADE ARC PLASMA FOR POLYMERIC SURFACE MODIFICATION

Mary Gilliam

Dr. Qingsong Yu, Dissertation Supervisor

## ABSTRACT

The plasma polymerization behavior of fluorocarbon systems was investigated using the monomers  $C_3F_6$ ,  $C_2H_2F_4$ ,  $C_4F_{10}$  and  $C_3F_6O$ , which were compared to methane and butane, Section III. In Sections V and VII, surface modification treatments were performed on seven polymers using low temperature cascade arc torch (LTCAT) of Ar with or without adding reactive gas of  $O_2$  or  $H_2O$ . Static and dynamic surface characterization techniques were used to examine changes in wettability and surface stability and surface degradation. In Section VI, a stainless steel mesh was placed in LTCAT to study its disturbance effects on LTCAT itself and on polymeric surface modification treatments.