**Electrical, optical, and structural characteristics of Al2O3 thin films**

**prepared by pulsed ultrasonic sprayed pyrolysis**

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The optical, structural, and electrical characteristics of aluminum oxide thin films deposited by

pulsed ultrasonic sprayed pyrolysis are reported. The films are deposited on crystalline silicon at

temperatures from 400 to 550°C using a chemical solution of aluminum acetylacetonate, as source

of aluminum, and *N*, *N*-dimethylformamide, as solvent. A H2O–NH4OH mist is supplied

simultaneously during deposition to improve the films’ properties. The results showed that the

properties of the as deposited films depended strongly on the number of pulses used and on the

substrate temperature. The thickness of the films is under 300 Å and the best films’ properties

showed an index of refraction close to 1.6 and a root mean square surface roughness of about 7.5 Å

in average. Infrared spectroscopy shows that SiO2 is observed at the interface with silicon of the

Al2O3 films and seemed to play, as expected, a dramatic role in the electrical characteristics of the

interface. Films with a dielectric constant higher than 8 and an interface trap density at midgap in

the 1010 eV−1 cm−2 range are obtained. Films deposited with three pulses and at 550 °C are able to

stand an electric field up to 4 MVcm.