TECHNOLOGY TRANSFER

Interest Exploratory Note

Compensated Alumina (ComAL) for Electronic Applications

Alumina (Al2O3) is a versatile ceramic and a 'workhorse' ceramic that finds place in a wide range of applications— mechanical, thermal, electrical, electronic and even optic. Indian industries are well-versed in alumina products for applications like refractory bricks, insulator tubes, crucibles etc. But, alumina components for electronic and similar high-tech applications are still imported. The drawback of pure alumina for electronic applications is the large temperature-coefficient of relative permittivity. Currently imported alumina ceramics suffer from high drift of dielectric constant with temperature and need firing temperature above 1600°C. But, the compensated alumina (ComAl), developed by VSSC, has near-zero temperature coefficient and can be sintered at ≤1475°C.

The ceramic has alumina as major content and a couple of additives and dopants. The powder of ComAl can be suitably processed further for making bulk products as per requirement. Bulk green bodies can be fired at ≤1475°C for less than 2h to get sintered ceramic. Sintered products can be polished, sliced or cut or machined for various applications. Typical properties of bulk ceramics are shown below

Firing temperature(°C)	1450 – 1475
Bulk density (g/cc)	3.9 ± 0.1
Resistivity (Ω.cm)	>109
Coeff. of Thermal Expansion (10^{-6}/K)	7 – 7.2
Thermal conductivity (W/m.K)	24 – 30
Dielectric constant (er) @ 5GHz	11 – 12
Loss factor (tand, 10^{-5}) @ 6 GHz	< 7
Qu of resonator @ 12GHz	> 10,000
Temp. coeff. of frequency (τf, ppm/K)	0 ± 5

Application Areas:

ComAl ceramics can replace conventional alumina ceramics in various electrical, electronic and RF applications.

VSSC is willing to offer the technology of ComAl to eligible interested parties who are in the field of manufacturing similar items

Interested entrepreneurs are requested to contact the address given below with all relevant particulars regarding their line of current activity, infrastructure available, market assessment of the product, financial arrangements made, turn over and sales of their products for the past years and a copy of their latest annual report.

Department of Space has authorised NSIL for Technology Transfer of Compensated Alumina (ComAl) for Electronic Applications to suitable entrepreneurs/ Industry in India. Interested Parties may please fill the enclosed form and send by email to contact-nsil@isro.gov.in