

SRINIVAS UNIVERSITY

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**Srinivas Research Centre for synthesis and characterization of aluminates**



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**About the Research Centre:**

The conductivity and dielectric properties of spinel aluminates depends upon several factors namely chemical composition, method of preparation, cation distribution, grain size etc. These materials behave as inhomogeneous dielectric materials in which individual high conducting grains are separated by either air gaps or low conducting grains. Study of the effect of temperature and frequency on the dielectric behaviour and ac conductivity offers much valuable information on the behaviour of the localized charge carriers which can lead to a good explanation and understanding of the mechanism of electric conduction and dielectric polarization in ferrite systems.

The electrical conductivity and dielectric properties of nanocrystalline spinel aluminates have not been studied thoroughly by researchers and exist a lot of anomalies in these systems. High energy ball milling has been successfully used to synthesize a wide range of nanosized powders. DC conductivity and dielectric studies varying temperature was employed to identify the conduction mechanism on these fine particle systems. The present work was initiated also to check the grain size and high energy ball milling effect on the structural, dielectric and DC conductivity properties of aluminates in the nanoregime.

Zinc aluminate can be prepared by low temperature preparative techniques. The milling of original ZnAl2O4 prepared as above using a planetary ball mill (Fritsch pulverisette 7) will yield ultrafine particles. A portion of the powder was placed in a steel vial with 10:1 ball to powder weight ratio keeping milling intensity at 200 rpm. Steel balls, agate balls or tungsten carbide balls can be used for milling. Powders can be milled at different milling times in dry atmosphere (dry milling) and in toluene medium (wet milling).

# List of publications so far:-

1. “Modification of dc conductivity and dielectric properties of nanosized zinc aluminates by high energy ball milling”, Proceedings of Two days National conference on “Scientific Bharat: Past, Present & Future” held at Kochi during 1-2 October, 2022.

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