ST. XAVIER'S COLLEGE (Autonomous),
PALAYAMKOTTAI – 627 002.
(Recognized as "College with Potential for Excellence" by UGC & Accredited at A++ Grade with a CGPA of 3.66 out of 4 in IV Cycle by NAAC)

ANNUAL REPORT 2024-2025

CRYSTAL RESEARCH CENTRE (2015)

Crystal Research Centre has successfully published three research papers in reputed journals. The first paper, **"Investigations of Efficient Nonlinear Optical Tetra Glycine Ammonium Sulphate (TGAS) Crystal for Optoelectronic Applications,"** explores the growth, characterization, and nonlinear optical properties of TGAS crystals, highlighting their potential use in optoelectronic devices. The second paper, **"Enhanced Specific Capacitance of Ni Foam-Coated Ag_2MoO_4 Symmetric Supercapacitor Synthesized by the Hydrothermal Method,"** focuses on developing high-performance supercapacitors using Ni foam-coated Ag_2MoO_4, demonstrating improved energy storage capabilities. The third paper, **"Efficient Nonlinear Optical Single Crystal Synthesized Using L-Threonine with Maleic Acid,"** reports the synthesis and characterization of an efficient nonlinear optical single crystal, enhancing its applicability in laser and photonic technologies.

In addition to these publications, one research paper has been submitted for publication: **"Enhanced Ethanol Sensing Performance of $FeMnO_3$ Thin Films Prepared by the Spray Pyrolysis Method with Variable Thickness."** This study investigates the effect of thickness variation on the ethanol sensing properties of $FeMnO_3$ thin films, providing insights into optimizing sensor performance.

The centre has also made significant progress in Ph.D. research, with two scholars (Mr. P. Gershom Jebaraj, Ms. M. Josephine Gladiya) successfully submitting their theses, contributing novel findings in nonlinear optics, energy storage, and gas sensing. Current and future research efforts are focused on advancing nonlinear optical materials for optoelectronics, enhancing supercapacitor efficiency, and refining thin-film gas sensor technologies using $FeMnO_3$ and other metal oxides. Additionally, the lab is developing hybrid materials for multi-functional applications, exploring emerging nanostructured materials for enhanced performance, and integrating AI-driven data analysis techniques for material characterization. Collaborative efforts with research institutions are being strengthened to translate these findings into real-world applications.