

We invite you to

**ACMiN SEMINAR**

**seminar topic:**

**"Advancing Energy Sustainability with Thiophene-Based Organic Thermoelectric Materials: Harvesting and Converting Waste Heat"**

**speaker**

**dr Vijayakumar Chakkooth**

**(Chemical Sciences and Technology Division (CSTD), CSIR-National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram, India)**

*Date: 18<sup>th</sup> April 2024 at 2:00 PM*

*ACMiN auditorium 1.02A, bldg. D-16 (Kawiory Street 30)*

*online:*



***Abstract:***

In recent years, there has been a growing interest in the development of sustainable energy solutions to address the increasing global demand for energy. One promising approach is the use of thermoelectric materials to harvest and convert waste heat into electricity. Thiophene-based organic materials have generated significant interest in thermoelectric applications due to their excellent electrical conductivity and chemical versatility. These properties allow for the fine-tuning of their thermoelectric properties, making them efficient for energy conversion. Our studies have explored the intricate roles of doping and charge transfer in optimizing the thermoelectric properties of thiophene-based systems. Through strategic use of dopants, we have achieved significant improvements in electrical conductivity and Seebeck coefficient in these systems. We have prepared, characterized, and studied thiophene-based small molecules and polymers with different doping agents. The structure of the conjugated backbone, doping mechanism, and degree of polymer aggregation are critical factors that affect the thermoelectric performance. We have utilized analytical methods to elucidate the structure-property relationships. Our study provides crucial insights for the design of high-performance thermoelectric materials, which have implications for sustainable energy conversion technologies.