# Editorial

In this edition, we explore diverse advancements in technology and environmental sciences, focusing on semiconductor fabrication, bioplastics, housing security systems, and quantum-enhanced machine learning for remote sensing. These research papers present innovative solutions to current challenges and provide insights into the future directions of these fields.

The first paper addresses the contamination issues by halogens (such as F, Cl, and Br) in semiconductor wafer fabrication, specifically in the back end of line (BEOL) processes. These contaminants cause significant challenges in metallization, leading to severe metal corrosion and defects in aluminum (Al) metal lines, bond pads, and vias. The study presents a detailed failure analysis of worm-like defects caused by Cl contamination, proposing a corrosion mechanism where a Cl-based chemical chain reaction leads to continuous and enhanced chemical corrosion. This research underscores the importance of addressing contamination issues to improve yield and reliability in semiconductor manufacturing [1].

The second paper focuses on the production of bioplastics as a sustainable alternative to conventional plastics. The study isolates and optimizes bacteria capable of producing bioplastics using sawdust, an agro-waste, as a low-cost substrate. Among the isolates, Bacillus cereus-SD2 showed the highest bioplastic (PHB) production under optimized growth conditions. This research highlights the potential of using waste materials and bacterial fermentation to produce environmentally friendly bioplastics, suggesting further optimization for industrial-scale production [2].

The third paper addresses the need for enhanced security systems in housing societies, particularly in the context of the COVID-19 pandemic. The proposed solution integrates facial recognition with body temperature sensing on a Raspberry Pi, coupled with an automated data collection web application. This system aims to improve safety and monitoring in housing societies, demonstrating the potential of combining biometric data with health monitoring technologies to address current public health challenges [3].

The fourth paper explores the application of quantum-enhanced machine learning for binary classification of satellite remote sensing data. The study compares the performance of a Support Vector Machine-quantum annealing solver (SVM-QA) with classical machine learning algorithms using 16 pre-labeled datasets. The results indicate that in 10 out of 16 datasets, the SVM-QA classifier outperforms classical algorithms in classification accuracy. This research suggests that quantum computing can significantly enhance remote sensing data analysis, contributing to more accurate environmental monitoring and decision-making [4].

These featured research papers highlight the innovative approaches being developed to tackle challenges in various fields, from semiconductor manufacturing and bioplastic production to housing security and remote sensing. Each study provides valuable insights and practical solutions that can drive future advancements and applications.

**References:**


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