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IIT-G research in colour changing crystals paves way for applications in biomedical imaging

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Findings open new doors for innovative applications and technologies, marking several key milestones in the field



Researchers from the Indian Institute of Technology Guwahati (IIT-G) have developed four new organic co-crystal systems with potential applications in drug discovery, imaging, therapeutics, fiber-optic communications and optical devices. The findings of the research have been published recently in the prestigious Journal Nature Communications.

Co-crystal engineering is a technique that enables the combination of compounds to enhance their functionality. These compounds find applications across diverse fields, ranging from drug development and materials science to new generation semiconductor devices and sustainable chemistry.

However, the challenge in working with co-crystals is that most of the reported co-crystals are highly planar and rigid. They tend to clump together, exhibiting a behaviour called aggregation-caused quenching (ACQ) which makes it difficult to find suitable donor-acceptor pairs and applications.

A breakthrough in this evolving field has been documented through collaborative research, led by Prof Parameswar K Iyer of IIT-G and scientists from the University of Hyderabad and the Indian Institute of Science (IISc) in Bengaluru. The IIT-G researchers have formulated four novel organic photo-functional co-crystals that can emit light efficiently with minimal loss.

The interesting property of these co-crystals is that they easily disperse in water, hence are effectively taken up by cells, resulting in vivid cellular images. The researchers have tested the imaging application and effect of engineered fluorescent co-crystals on breast cancer cells.