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ENGINEERING

MONASH University

Faculty of Engineering
Summer Research Program 2022-2023

Project Title: Lead-free perovskite nanocrystals for novel optoelectronic applications

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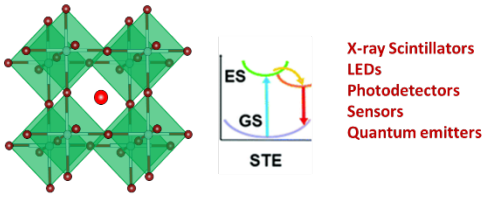
Objective

1. Learn how to synthesize and characterisise lead-free perovskite nanocrystals
2. Experience how to undertake research within a research group.

Project Details

Metal halide perovskites with a general formula of ABX_3 (where A and B are cations and X is a halogen) are the most studied material system in the last 10 years because of their remarkable optoelectronic properties[1-3]. However, most efficient systems possess lead as a divalent cation in the crystal structure which limits its end use and practical applicability. The worldwide-based research efforts for synthesizing alternative lead-free perovskite materials that match the exceptional optoelectronic characteristics of lead halide perovskite nanocrystals has not yet delivered any outstanding candidates. For this reason, further efforts are needed to achieve defect tolerant perovskite structures utilizing environmentally benign elements. This project will focus on the development of such environmentally-friendly next-generation optoelectronic materials.



Reference:
1. Ivan Infante, Liberato Manna, Nano Lett. 2021, 21, 6−9
2. Yanyan Li et al. Mater. Chem. Front., 2021, 5, 4796–4820
3. Chun Kiu Ng, Chujie Wang, Jacek J. Jasieniak, Langmuir 2019, 35, 36, 11609–11628

Prerequisites

Materials Science, Chemical Engineering, Physics or Chemistry.