pH sensing, bioimaging, and Fluorescence lifetime imaging microscopy using polyethyleneimine coated carbon dots and gold nanoparticles

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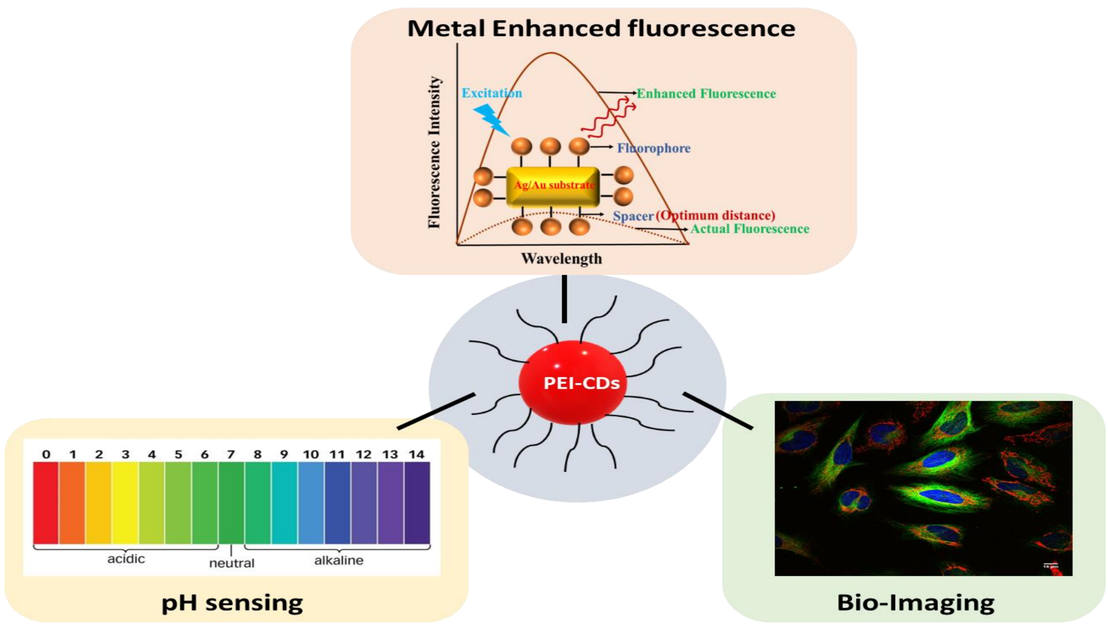
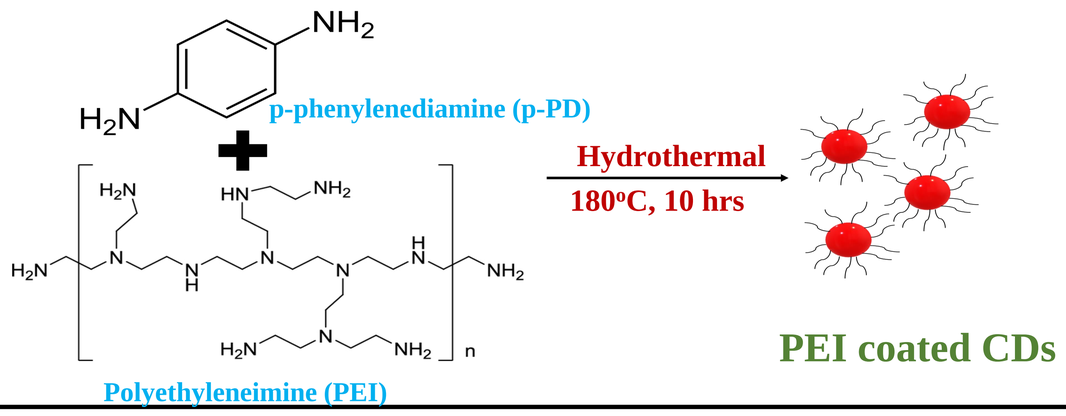
Introduction and Objectives

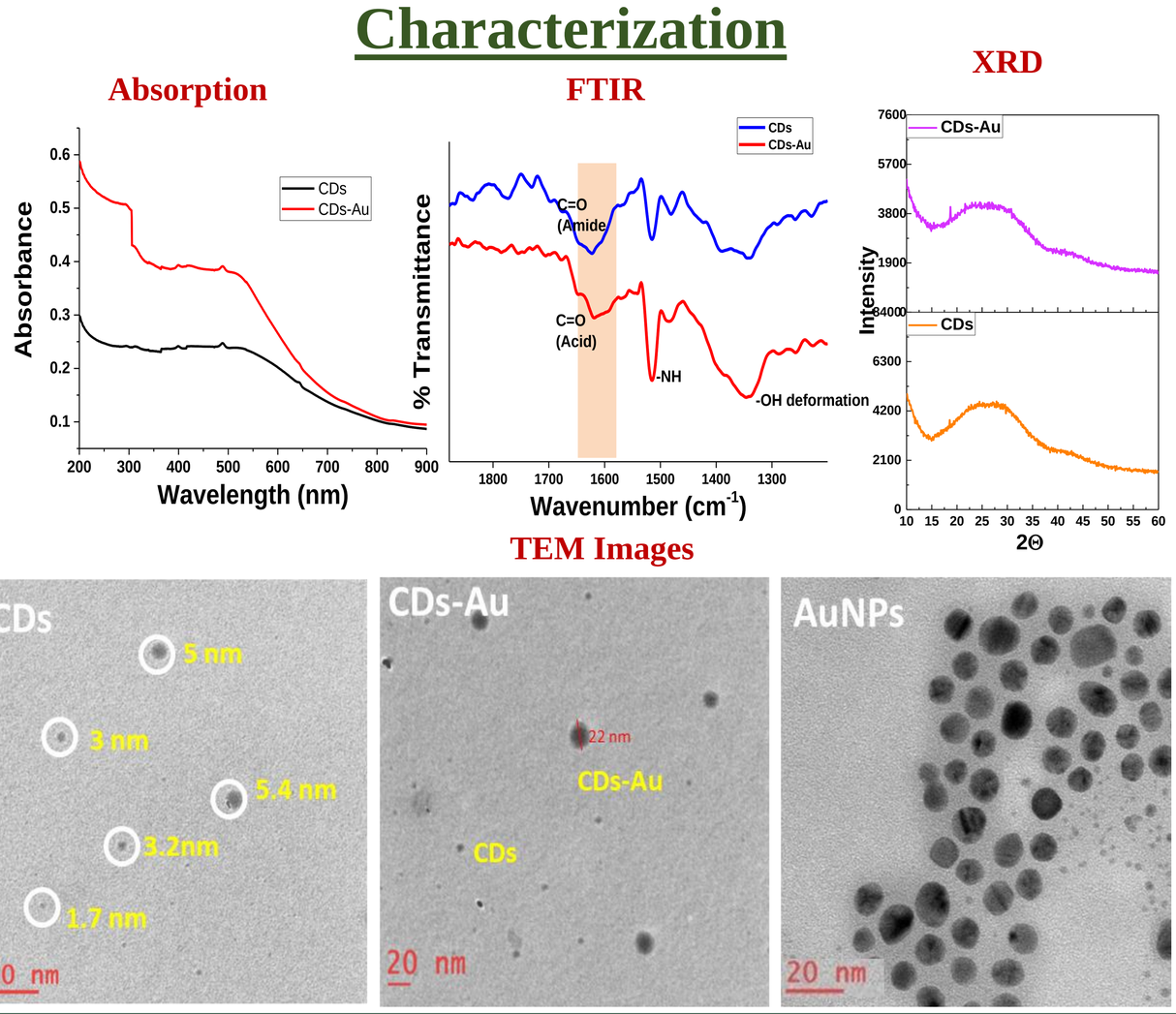
- The unique fluorescent nanomaterials known as carbon dots (CDs) are highly resistant to photobleaching, have low toxicity, and are well soluble in water.
- Polyethyleneimine (PEI) coated CDs are a novel fluorophore with good biocompatibility and pH sensing ability.
- This nanohybrid can be used for metal enhanced fluorescence, pH detection and as biolabeling reagent.



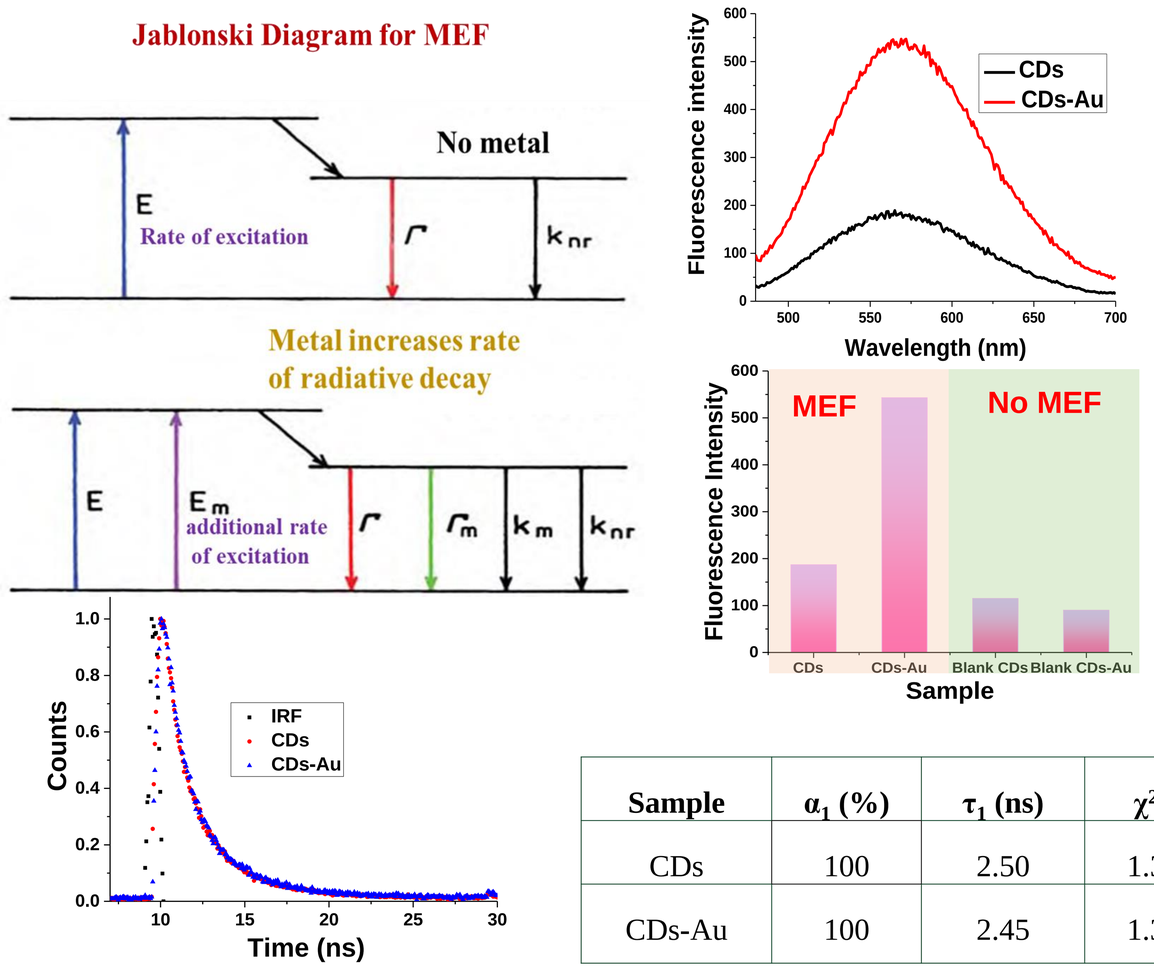
Preparation PEI-coated carbon dots



Characterization

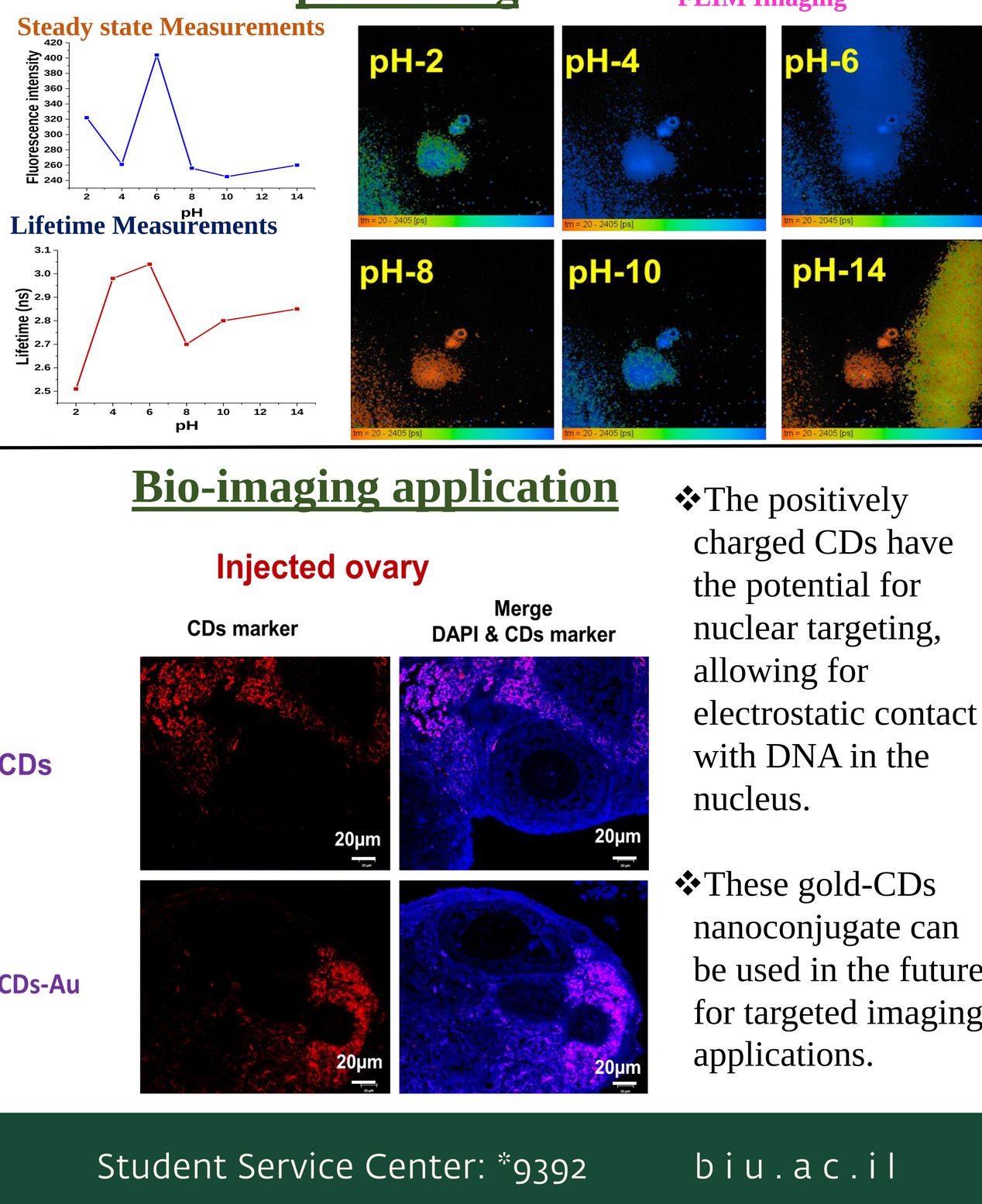


Metal Enhanced Fluorescence



Sample	α_1 (%)	τ_1 (ns)	χ^2
CDs	100	2.50	1.3
CDs-Au	100	2.45	1.3

pH sensing



Bio-imaging application

- The positively charged CDs have the potential for nuclear targeting, allowing for electrostatic contact with DNA in the nucleus.
- These gold-CDs nanoconjugate can be used in the future for targeted imaging applications.