Functional Chemistry for Biomedical Imaging and Solar Cell Applications

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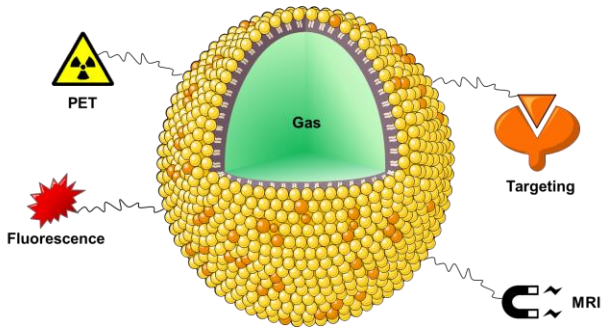
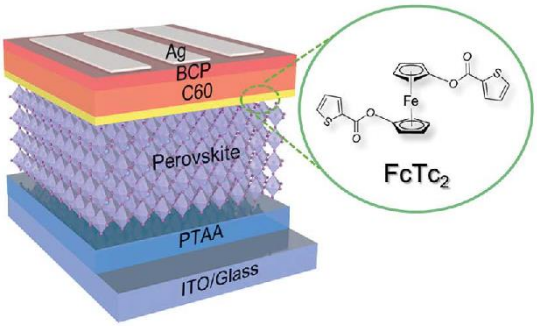
The presentation will describe two different areas of recent work from the Long group, featuring organometallic and inorganic coordination chemistry:-

(1) Microbubble (MB) contrast agents are emerging as new molecular imaging probes for cancer detection.[1] Being non-ionizing, real-time and accessible, ultrasound (US) imaging has shown great promise *in vivo*. However, its inability to image whole body pharmacokinetics is hampering MB access to broader clinical practice. Thus, new MB formulations capable of overcoming these limitations and offering early-stage detection of disease are needed. The presentation will feature our initial efforts to incorporate positron emission tomography (PET) agents onto MBs.[2,3] These PET/US dual-modal MBs incorporate the advantages of PET imaging, thereby allowing whole MB pharmacokinetics to be assessed.



(2) The iconic organometallic 'sandwich' compound, ferrocene, has been studied for a myriad of different applications, spanning the fields of catalysis, materials chemistry and beyond, and even after 70 years, new uses for ferrocene are still being discovered. One particular field where ferrocene has gained interest is in that of molecular electronics. Ferrocene has exceptionally well-defined redox chemistry that has seen it often included into molecular architectures, particularly involving metal-alkynes, as an electroactive component. These electronic properties, alongside the versatile substitution chemistry of ferrocene, has recently been exploited by us in developing highly efficient and stable perovskite solar cell devices. The presentation will cover our recent findings in utilising ferrocene compounds as inter- layers within highly efficient and stable perovskite solar cells.[4,5]



References

[1] J. R. Lindner, *Nat. Rev. Drug Discov*. **2004**, 3, 527; [2] J. Hernandez-Gil et al, *Chem. Sci*. **2019**, 10, 5603; [3] J. H. Teh et al, *Chem. Commun*. **2021**, 57, 11677; [4] Z. Li et al, *Science* **2022**, 376, 416; [5] B. Li, *J. Am. Chem. Soc*. **2024**, 146, 13391.

Biography

Nick Long holds the Sir Edward Frankland BP Endowed Chair in Inorganic Chemistry at Imperial College London. He is a leader in applied synthetic inorganic and organometallic chemistry, with research interests focussing on transition metal and lanthanide chemistry for the synthesis of functional electronic and renewable energy materials, homogeneous catalysts and probes for biomedical imaging. He has over 320 publications, with around 15000 citations, an h-index of 58, and i10-index of 168. His work has recently been recognised by a Royal Society Wolfson Merit Award (2018), the Royal Society of Chemistry Frankland Award (2020), and the Royal Society of Chemistry Interdisciplinary Prize (2023). Nick is a Fellow of the European Academy of Sciences (FEurASc) and served on the UK RAE2021 Chemistry panel.