

Editorial

Lanthanides

Lanthanide chelates are becoming an ever popular choice of luminescent probe and tool in clinical diagnostics, basic research, drug discovery, sensing, and imaging. Over the last 10 years or so, we have seen the development of highly luminescent chelates, novel chelating ligands, and many different types of luminescence-based nanobeads. These chelates display unique spectral and temporal properties making them the ideal probe choice in the applications that require a high degree of labeling, multiplexed analyte detection, and background discrimination/suppression. One particular area of importance has been the use of lanthanide chelates in immunoassays, where their long lifetimes overcome intrinsic biological autofluorescence. The emission bands of lanthanide complexes are also very narrow, with Stokes shifts typically over 250 nm for europium and over 200 nm for terbium complexes, alleviating self-quenching at high extents of labeling/loading.

The ligand enhanced lanthanide luminescence is a complicated process which involves both multiple ligand and ion energy levels. While many of these processes are not fully understood, the complicated nature of the energy transfer process has provided many opportunities

for the development of a broad range of complexes with very different spectral and temporal properties. These new novel compounds are subsequently finding common place in many new assay platforms.

In this special issue, dedicated to the *Advances and Progress in Lanthanides*, we have assembled leading-edge authors from around the world who are all involved in the developments in this continually expanding area of research. We have organized this special issue in such a way as to give readers a flavor of the current research and thinking, with contributions covering near-infrared lanthanides, lanthanide based bioassays, water soluble lanthanide nanoparticles as well as upconverting lanthanide phosphors, to name but just a few.

In conclusion, we would like to thank all the authors for their invaluable and timely contributions, which reflect well the activity in this research area today.

Kind regards
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Lanthanide Special Issue Editors