Chemical and Electrochemical Control of Emission Colour in Electrochemiluminescent systems.

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The control of emission colour in electrochemiluminescence (ECL) can be understood to mean three different things: 1) The characteristic emission wavelength of the emitting species can be tuned through systematic structural changes to the molecule during synthesis. 2) The colour of the ECL emission can be made sensitive to the chemical environment of the molecule and 3) The colour of the ECL emission can be made to be sensitive to the applied potential.

In this presentation we will discuss how ECL emission can be controlled in one sense by understanding the complex interplay of photophysical and electrochemical properties of the emitting species and using this understanding to inform in the design of new electrochemiluminophores of varying emission wavelength.[1-2] Our recent work with luminescent complexes of platinum, Iridium and ruthenium will be discussed.

We will also discuss the modulation of ECL emission colour in another sense, where electrochemiluminescent complexes containing ligands which can be protonated, are shown to be pH sensitive with respect to their emission wavelength.

Finally, we will discuss the ability to modulate emission wavelength by selectively exciting luminescent species from mixtures or eliciting potential dependant changes to the luminophore. Moreover, we will describe the ability to continuously vary the emission colour by scanning the electrode potential, the production 3D-ECL excitation emission matrixes and the possibilities for enhanced selectivity or multiplexed ECL detection by exploiting both the potential and wavelength axes. [3-5]

The amenability of the above concepts to low-cost sensing strategies based on paper microfluidics, where a mobile phone is co-opted to act as both a luminescence detector and a potentiostat will also be discussed.

References