Ultrasensitive electrochemiluminescence imaging of single entities: from cells to biomolecules

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Electrochemiluminescence (ECL) is the light emission triggered by an electrochemical reaction at the electrode surface [1-2]. Since ECL is based on an "electro-excitation" process, it does not require any light source to generate the light as in fluorescence. Thus, ECL combines intimately electrochemistry and photophysics. Due to the orthogonal modalities of electrochemical stimulation and optical readout, ECL attracts growing interests in diverse scientific fields, from fundamental research on Marcus inverted region and design of highly efficient ECL fluorophores to original biosensing and imaging strategies.

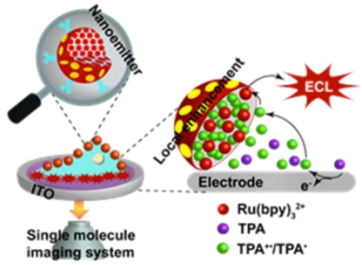

Figure 1. *ECL microscopy at the single molecule level.*

In the first part, the development of coreactant-based ECL as a surface-confined microscopy to image single cells and their membrane proteins down to the single molecule level (Figure 1) will be discussed [3-7]. In a second part, new ECL approaches such as photo-induced ECL based on illuminated semi-conductors will be presented to extend the performances of ECL (bio)sensing and photo-addressable systems [8-10].

Keywords: electrochemistry, luminescence, microscopy, single cells, nanomaterials

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