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# Lighting up the Electrochemiluminescence of Carbon Dots through Pre- and Post-Synthetic Design

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Biomarkers are biological indicators with a key role in identifying human body function changes. Their quantitative detection is fundamental in clinical monitoring implementation and early screening of diseases. Recently, a huge number of sensors are developed with these goals.[1] In this context, electrochemiluminescence (ECL) is a leading technique in the field of immunoassays-based biomarker detection and biosensors fabrication thanks to the great sensitivity of the technique.[2] Electrochemiluminescence is a luminescent phenomenon induced by an electrochemical stimulus with a high signal-to-noise ratio. In the quest for ever-increasing sensitivities, ECL can ideally be coupled to nanotechnology to develop new systems and strategies for analyte determination even in very complex matrices.[3] Nanotechnologies can improve the sensitivity and sensibility of ECL technique thanks to their advantageous and tuneable properties.[4] For example, Carbon Dots are a class of photoluminescent and electrochemiluminescent nanomaterials, specifically carbon-based nanoparticles, with ECL elusive properties. Here we focus our attention on ECL proprieties of BCDs, Carbon Nanodots functionalized with boron-dipyrromethene (Bodipy), and how pre- and post-synthetic design strategies improve the ECL emission properties, opening new opportunities for exploring CDs in biosensing applications. BCDs are excellent candidates as an alternative to $Ru(bpy)_3^{2+}$ luminophores thanks to their features, such as nontoxicity, chemical inertness, high resistance to photobleaching and unique ECL properties. The final goal is the development of an efficient ECL nanomaterial with high ECL intensity and simple bioconjugation. [5]

## References

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## Figure

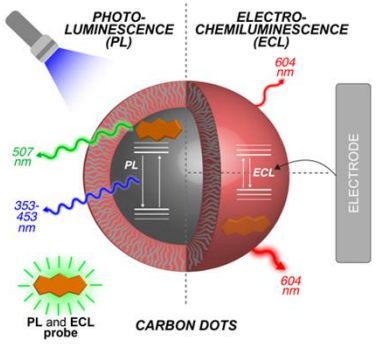


**Figure 1:** Schematic representation of the ECL and PL mechanism of Bodipy Carbon Nanodots.