The origin of a broad low energy photo-luminescence (PL) and electro-luminescence (EL) band emerging upon oxidative degradation of highly emissive polyfluorenes (PFs) has recently been identified as the emission from onchain keton type defects acting as exciton and/or charge traps. In this work we compare several polyfluorenes with respect to their stability upon thermal degradation, and their stability upon fabrication and operation of PF-based polymer light emitting devices (PLEDs). We show that in addition to the keton emission a second type of defect emission, which is related to the deposition of the metal electrode, but independent of the bulk-keto defect can also affect the color purity of PF-PLEDs. The investigated materials are monoalkylated poly(9-alkylfluorene), poly(9,9 dialkylfluorene) with hexahydrofarnesyl sidechains (PF111/12), PF2/6 and two different slightly branched spiro-PF2/6s’ with and without triphenylamine endcappers. In conclusion we find that for the fabrication of color-stable PF-based PLEDs it is therefore not only important to provide chemically stable polymers to prevent the formation of bulk polymer keto type defects, but also to well control the evaporation process to avoid the formation of emissive defects at the interface.