Synthesis and electrochemistry of 5, 5’-dimethyl[12, 12’]bibenzo[b]acridylidene

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A redox type electrochemically generated chemiluminescence (CL) of lucigenin $1^{2+}$ has been known. For the purpose of extending light wave length, we planed to synthesize 5, 5’-dimethyl[12, 12’]bibenzo[b]acridylidene 2. Benzo derivative 2 was prepared by application of the conventional method for 1. Acylation of aniline with 3-hydroxy-2-naphthoic acid 3 to give 3-anilino-2-naphthoic acid 4, followed by intramolecular Friedel-Craft acylation to give 12-chlorobenzo[b]acridine 5, hydrolysis of 5, methylation with CH$_3$I, and finally coupling reaction with Zn-HCl provided the object benzo derivative 2.

In electrochemical property, benzo derivative 2 was shown typical cyclicvoltammetric curves. The waves peaking at -1.30 V, at +0.48 V, at +0.73 V, at +1.14 V correspond to the reduction of 2$^{2+}$, and those peaking at -2.10 V, at -0.87 V, at -0.69 V, at +0.60 V correspond to oxidation of 2. Weak ECL emission was observed in absolute DMF.