## Preparation of Quinone-Imide Ketals From Amides with Hypervalent Organo-Iodine Compounds

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Abstract : lodosylbenzene in methanol in the presence of molecular sieves oxidises amides into quinone-imide mono ketals.

In recent years, hypervalent iodo-compounds have attracted increased attention in organic synthesis.<sup>1</sup> Recently, we have shown that iodosylbenzene and bis-acyloxy iodoarenes to be attractive reagents for the synthesis of quinones from phenols and quinone-imines from heterocyclic amines.<sup>2</sup> Currently, only electrochemical oxidation affords quinone-imide monoketals from amides.<sup>3</sup> These compounds have been proposed as intermediates in a number of biological processes.<sup>4</sup> We report in the present communication our results leading to the formation of sulfonimide ketals from sulfonamides with iodosylbenzene in alcohol.

In a typical procedure, 1 mmole of 1 was added to a stirred suspension of 2.5 equivalents (530 mg) of iodosylbenzene (1.2 equivalent with 3) and 100 mg of molecular sieves (4 A) in methanol at 0°C under nitrogen. The mixture was stirred for 1 hour. After filtration, the residue was triturated with pentane and ether. The organic layers were concentrated and the product was purified by preparative TLC. This reaction was applied to different amides  $1-7^5$ .



The oxidation of N-(hydroxyphenyl)benzene sulfonamide 9 afforded quinone-imide 10 quantitatively :



Bicyclic quinone-imide ketal 12 was synthesised from 11 and benzamides 13 and 14 were oxidised into 15 and 16 respectively under same conditions.



Lastly, bis-acyloxy iodoarenes 17 (C<sub>6</sub>H<sub>5</sub>I(OCOCF<sub>3</sub>)<sub>2</sub>) and 18 (C<sub>6</sub>F<sub>5</sub>I(OCOCF<sub>3</sub>)<sub>2</sub>) led to the same reaction in the presence of base (K<sub>2</sub>CO<sub>3</sub> or DBU) in order to quench the liberated acid. 1 was transformed into 2 with 17 (70 % in the presence of K<sub>2</sub>CO<sub>3</sub>, 40 % in the presence of DBU) and with 18 (43 % in the presence of K<sub>2</sub>CO<sub>3</sub>). In the absence of molecular sieves, quinone-imide 10 was formed and in the absence of base, benzoquinone was obtained.

In conclusion, this very easy reaction afforded quinone-imide ketals from amides under mild conditions.

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- 4. Chen, C.P.; Shih, C.; Swenton, J.S. Tetrahedron Lett. 1986, 27, 1891-1894.
- 5. Compounds were identified by spectroscopic data : I.R., <sup>13</sup> C NMR, <sup>1</sup>H NMR, and SM.

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2134