Dye functionalized nanosized SiO_2 for photodynamic therapy

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Introduction

Malign tissues can be damages by $^1O_2$ generated in situ, from a dye sensibilization in photody therapy(PDT), dye functionalization may reduce a excited state desactivation by the medium, thus, reducing necessary drug dose. This work evalueted chemically linking a dye to nanosized SiO_2 in order to generate $^1O_2$ for PDT purposes.

Results and discussion

Compounds A and B were prepared by formation of amines and amides derivates, using 3-aminopropiltrietoxysilane (APSG) or cloropropiletoxysilane (CPSG) functionalized nanosized SiO_2 with the respective acyl chloride or amine dye derivate. The reaction of B plus 3 gave 6, while reactions of A plus 1 and A plus 2 gave 4 and 5, respectivelly (Fig 1). Analogs of 4,5 and 6 were prepared by the reaction of the acyl chloride dye derivate with butylamine. Giving 4a, 5a and 6a, respectivelly.

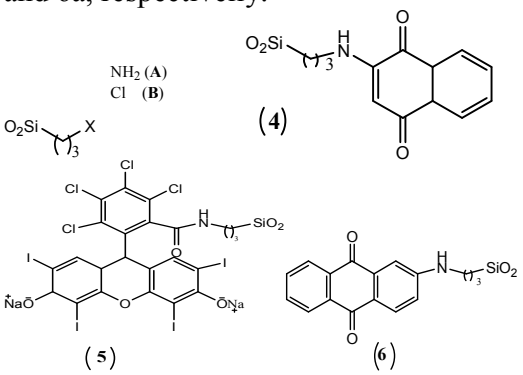

Figure 1: Compounds

Table 1 show that $^1O_2$ formation quantum yields ($^1O_2$ FQY) for 4,5 and 6 are higher than the respective 4a, 5a and 6a analgs. The most sensitive dye is rose bengal wich 5a derivate is not able to produce $^1O_2$. The reduced $^1O_2$ FQY for the 4a-6a is probably due to an enhaced excited state destivation by the butyl group.

Table 1: $^1O_2$ formation quantum yields

Compound	$^1O_2$ formation quantum yields (%)
Fenalenone	1,000
4	0,700
4a	0,530
5	0,017
5a	0,000
6	0,019
6a	0,014

Conclusion

Results shows that chemically anchoring the dyes to nanosized SiO_2 can be used in PDT purposes as $^1O_2$ generators.

Acknowledgments

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