



HAL
open science

Rose Bengal based polymer colloids for photosensitized singlet oxygen production

Guillaume Mageste, M. Ali Aboudzadeh, Lopez B, Axelle Desriac,
Jean-François Blanco, Patrice Bacchin, Karine Loubière, Mickael Le Béhec,
Thierry Pigot, Maud Save

► **To cite this version:**

Guillaume Mageste, M. Ali Aboudzadeh, Lopez B, Axelle Desriac, Jean-François Blanco, et al.. Rose Bengal based polymer colloids for photosensitized singlet oxygen production. Journées Groupe Français des Polymères Sud-Ouest, Mar 2024, Barbaste, France. hal-04796703

HAL Id: hal-04796703

<https://hal.science/hal-04796703v1>

Submitted on 21 Nov 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Rose Bengal based polymer colloids for photosensitized singlet oxygen production

Guillaume. Mageste^a, Ali. Aboudzadeh^a, Bastien. Lopez^a, Axelle. Desriac^b, Jean Francois. Blanco^b, Patrice. Bachin^b, Karine. Loubiere^b, Michael. Le Behec^a, Thierry. Pigot^a, Maud. Save^a

^aUniversité de Pau et des Pays de l'Adour, E2S UPPA, CNRS, IPREM, PAU, France

^bLaboratoire de génie chimique, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France.

Contact : guillaume.mageste@univ-pau.fr

Harvesting visible light to implement low energy processes fulfills some principles of green chemistry. Photosensitized singlet oxygen production involving light, oxygen from air and catalytic amount of photosensitizer is particularly attractive for producing fine chemical intermediates of interest, for air/water photo-decontamination, or for photodynamic inactivation of bacteria¹. Immobilizing photosensitizers on solid substrates improves their handling, recyclability and photostability. In order to achieve a sustainable photochemical process, various generations of submicronic photoactive latex particles anchoring Rose Bengal (RB) as photosensitizer, were designed by miniemulsion polymerization² or dispersion polymerization (PISA) (present work) to meet the challenge of continuous flow photo-oxidation of biobased molecule while paving the way for organic photocatalyst recycling. This study focuses first on the design of photosensitizer-based core-shell latex particles synthesized by dispersion polymerization in ethanol. Through the determination of the average quantum yield of singlet oxygen production (ϕ_{Δ}), we proved the efficient production of singlet oxygen at the particle/alcohol interface under visible light irradiation. The present study proposes to investigate whether the colloidal features or RB loadings might affect ϕ_{Δ} . Preliminary outcomes of continuous flow photo-oxidation of a bio-based molecule will also be presented. Finally, the interest of latex particles is their film-forming properties to prepare coatings by simple casting. We indeed reported that the photosensitizing properties of Rose Bengal can be transferred to surfaces,³ which open perspectives to design functional surfaces for various applications such as antibacterial surfaces.

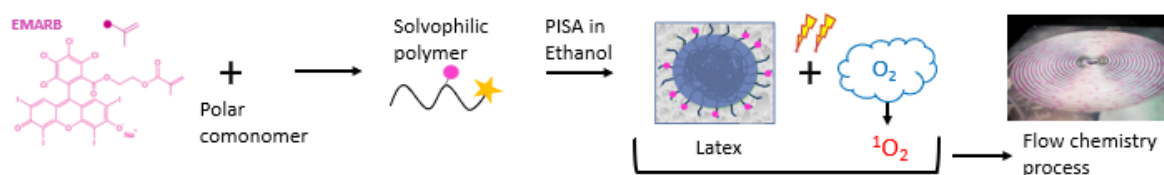


Figure 1: Scheme of synthesis of photosensitizer-based polymer colloids

Références :

- [1] M. Magaraggia, F. Faccenda, A. Gandolfi, G. Jori, JEM, 2006, **8**, 923-31.
 [2] L. Petrizza, M. Le Behec, E. Decompte, Hind El Hadri, S. Lacombe, M. Save. Polym. Chem., 2019, **10**, 3170
 [3] C. Boussiron, M. Le Behec, J. Sabalot, S. Lacombe, M. Save, Polym. Chem., 2021, **12**, 134