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Pluronic L121 as innovative solvent for CO2 sorption under pressure

Guido Angelini and **Carla Gasbarri**

University "G d'Annunzio" of Chieti-Pescara, Italy

Abstract

Poly(ethylene oxide)-poly(propylene oxide)-poly (ethylene oxide) triblock copolymers are high molecular weight non ionic surfactants, commercially available as Pluronic. Generally, polymeric micelles and vesicles represent highly biodegradable and biocompatible systems, involved in a large range of applications from drug delivery to nanostructured materials due to their thickness, mechanical stability, and chemical functionality. One of the most investigated Pluronic is L121 considered as an ideal copolymer for drug target because of the capability to aggregate into vesicles having strong solute retention. Recently, the critical aggregation concentration of L121 in some ionic liquids and in D2O has been spectroscopically determined (Angelini, G.; Gasbarri, C., Curr. Drug Targets 2015, 16, 1606-1611), while a dense three-dimensional network showing a viscoelastic gel-like behavior has been observed in the presence of single-walled carbon nanotubes above a critical percolation concentration (Gasbarri et al., Chem. Eur. J. 2016, 22, 546-549).

The aim of this work was to determine the efficacy of L121 as solvent for carbon dioxide sorption. Successful method to capture CO2 are based on polyethylene and polypropylene glycols under high pressure as demonstrated by the spectral changes of the polymer in the liquid state before and after the gas exposure. L121 shows the CO2 typical bands in the NIR region of the spectra from 15 to 40 °C according to a linear correlation. The effect induced by temperature on the swelling degree of L121 was also investigated and compared to the data obtained by using other viscous media, as Triton X-100 and BMIM BF4 (Angelini et al. J. Mol. Liquids 2018, 258, 85-88).

Biography

Guido Angelini is graduated with honors in Pharmaceutical Chemistry and Technology. He has completed his PhD in 2002 at the University "G. d'Annunzio" of Chieti-Pescara, Italy. He is researcher/assistant professor of Organic Chemistry at the Department of Pharmacy since 2006. He author and co-author of 36 publications that have been cited over 500 times and his publication H-index is 16. He is scientific referee for high impact journals in the field of Organic Chemistry. In 2018 he was the Guest Editor for the Current Organic Chemistry Special Issue "New Supramolecular Frontiers: From Design to Innovation". He is member of Royal Society of Chemistry since 2016.

Publications

1. 2020_Curcumin in silver nanoparticles aqueous solution Kinetics of keto-enoltautomerism and effects on AgNPs_esi.pdf
2. Curcumin in silver nanoparticles aqueous solution: kinetics of keto-enol tautomerism and effects on AgNPs
3. Microwave-assisted simple synthesis of 2- anilinopyrimidines by the reaction of 2-chloro-4,6- dimethylpyrimidine with aniline derivatives
4. Simple Determination of Silver Nanoparticles Concentration as Ag + by Using ISE as Potential Alternative to ICP Optical Emission Spectrometry
5. Silver nanoparticles as interactive media for the azobenzenes isomerization in aqueous solution: From linear to stretched kinetics
6. New Supramolecular Frontiers: Innovation from Design to Applications
7. Pluronic L121, BMIM BF4 and PEG-400 comparison to identify the best solvent for CO2 sorption
8. Learning organic chemistry day by day: The best choice of the best pharmacy students
9. Dual targeting of cancer-related human matrix metalloproteinases and carbonic anhydrases by chiral N -(biarylsulfonyl)-phosphonic acids
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