

Tailor-made Polymers bearing Chelating Moieties for encapsulation of nanoparticles : Catechol - Phosphonic Acid - Thiol

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Catechol - Phosphonic Acid - Thiol

Tailor-made Polymers bearing
Chelating Moieties

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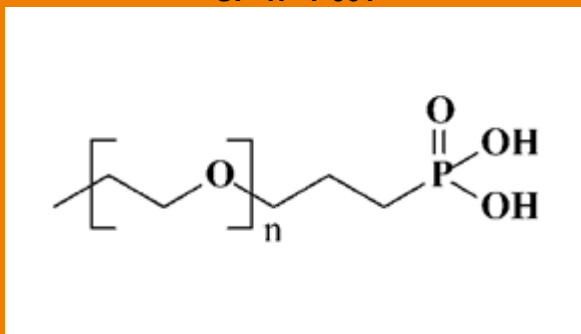
Nanomedicine represents a set of interdisciplinary research at the interface between biology, physics and chemistry. Recent researches highlight the growing interest of **functional polymers for the implementation of multi-functional nanoparticles coatings**, resistant to protein adsorption, providing high stability, stealthiness, low cellular uptake and increased biodistribution in vivo.

For more than six years, **SPECIFIC POLYMERS** is developing new **multi-functional polymers for nanoparticles coatings**. Phosphonic acids were proved to be a suitable anchoring group for many kinds of nanoparticles (Iron Oxide, Gadolinium, Cerium Oxide, etc.)

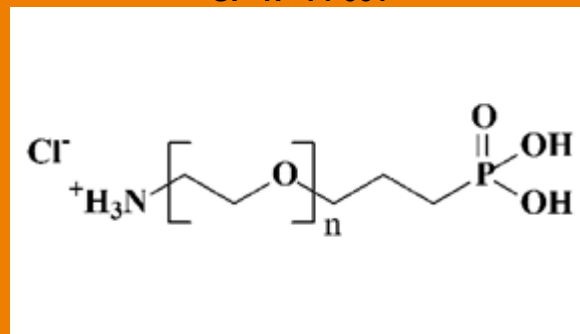
and additional functionalities (carboxylic acids, amines, etc.) can be added on the polymeric structure to favor the grafting of targeting peptides or proteins.

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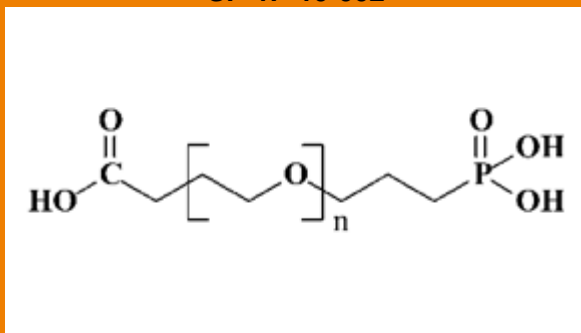
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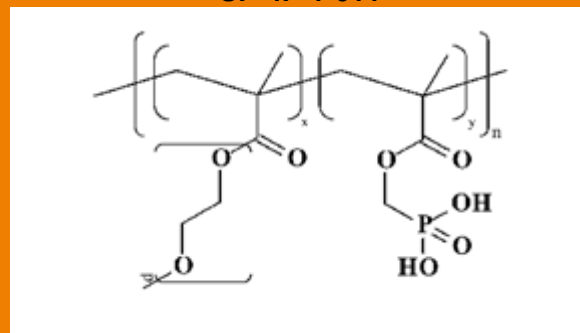
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SP-1P-10-002



SP-4P-1-011

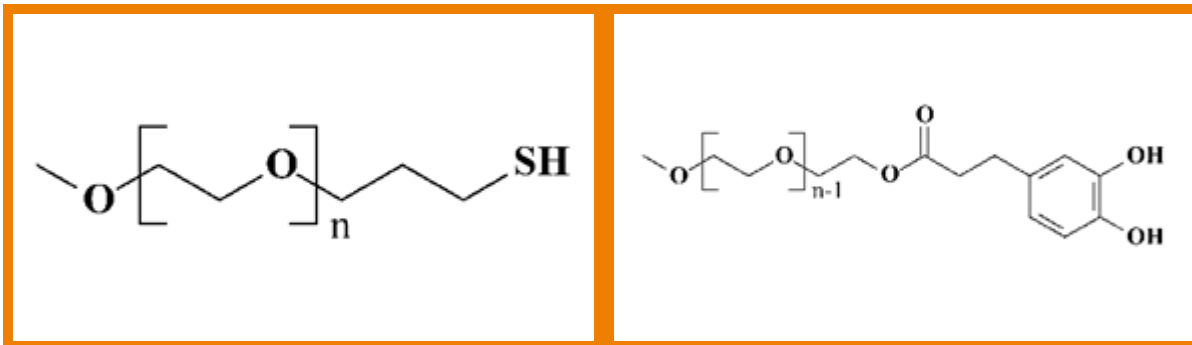


As an example, coated Gadolinium nanoparticles exhibit near-infrared persistent luminescence properties and can be used as in-vivo nanotools; **CeO₂ coated nanoparticles** have shown powerful **antioxidant properties** that can reduce oxidative stress and thus ischemic damage in stroke treatment; **Fe₂O₃ superparamagnetic iron oxide nanoparticles** (SPIONs) were shown to be very promising material for biomedical applications and have been extensively used in cancer therapy and diagnosis via magnetic targeting or magnetic resonance imaging.

Apart from phosphonic acid, other chelating groups can be used as nanoparticles anchoring groups such as **thiol or catechol**.

SP-1P-6-003

SP-1P-9-020



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Iron oxide nanoparticle surface decorated with cRGD peptides for magnetic resonance imaging of brain tumors



S. Richard & Al.; 2016; *Elsevier*

Delayed hepatic uptake of multi-phosphonic acid poly(ethylene glycol) coated iron oxide measured by real-time magnetic resonance imaging



G. Ramniceanu & Al.; 2016; *RSC Adv*

Recent advances in superparamagnetic iron oxide nanoparticles (SPIONs) for in vitro and in vivo cancer nanotheranostics



G. Kandasamy, & Al.; 2015; *Elsevier*

Preventing Corona Effects: Multiphosphonic Acid Poly(ethyleneglycol) Copolymers for Stable Stealth Iron Oxide Nanoparticles



V. Torrisi & Al.; 2014; *Biomacromolecules*

Serum Protein-Resistant Behavior of Multisite-Bound Poly(ethylene glycol) Chains on Iron Oxide Surfaces



N. Giambianco & Al.; 2017; *ACS Omega*

Non-Aqueous Sol-Gel Synthesis of Ultra Small Persistent Luminescence Nanoparticles for Near-Infrared In Vivo Imaging



E. Teston & Al.; 2015; *Chem. Eur.*

[ICONS ANR-Project >](#)

In the area of nanomedicine, SPECIFIC POLYMERS is involved in ICONS project. This collaborative project is a French National Project financed by the 'Agence Nationale de la Recherche' (ANR) where **innovative polymers are being developed to coat cerium oxide nanoparticles of interest for stroke treatment.**

[SF-Nano 2018 >](#)

SPECIFIC POLYMERS presented all its innovative functional polymers for nanoparticles encapsulation to the French Society for Nanomedicine (SFNano) during SFNano 2018 5th annual meeting (3-5 December 2018).

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