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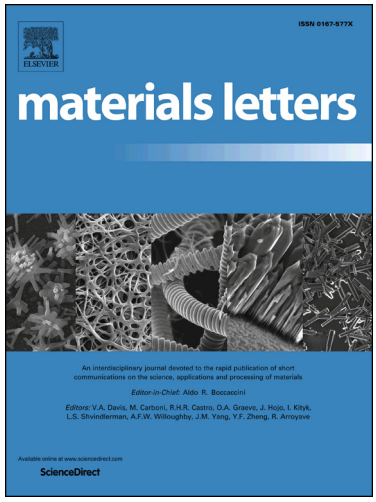


# Poly(styrene-*co*-maleic anhydride) nanoparticles as protein carriers

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**Poly(styrene-*co*-maleic anhydride) nanoparticles as protein carriers.**

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**Abstract**

Considering the increasing interest for protein immobilization on nanoparticles, in this work, we demonstrate the preparation of poly(styrene-*co*-maleic anhydride) (PSMA) nanoparticles and their capability to conjugate the proteolytic enzyme papain. PSMA nanoparticles were fabricated by combining precipitation and electrospray technique. Different experimental conditions were tested in order to optimize nanoparticle dimensions and production yield and different techniques were used to characterize the produced nanoparticles. Their mean diameter was found to be 176 nm. The successful papain-nanoparticle conjugation was then demonstrated. The residual catalytic activity of the conjugated enzyme was studied and found to be around 79% respect to the free enzyme.

*Keywords:* poly(styrene-co-maleic anhydride); nanoprecipitation; electrospray; papain.

## 1. Introduction

The immobilization of proteins on solid matrices is a highly active field of research promoted by industrial and medical interests. In biotech industrial processes, immobilization makes possible the re-use of enzymes, improving their structural stability and resistance to inhibitors [1]. In nanomedicine, the interest to conjugate proteins and nanoparticles goes with the increasing interest for protein as therapeutics. Proteins, due to their high specificity and functionality, have emerged as promising therapeutics for the prevention and treatment of various diseases [2]. However, the in-