

# Binding and Release of Glutamate from Overoxidized Polypyrrole via an Applied Potential for Application as a Molecular Switch

Elizabeth von Hauff<sup>a</sup>, Yulia Meteleva-Fischer<sup>a</sup>, Jürgen Parisi<sup>a</sup>, and Reto Weiler<sup>b</sup>

<sup>a</sup> Institute of Physics, Energy and Semiconductor Research Laboratory, Carl von Ossietzky University of Oldenburg, D-26111 Oldenburg, Germany

<sup>b</sup> Institute of Biology and Environmental Studies, Neurobiology, Carl von Ossietzky University of Oldenburg, D-26111 Oldenburg, Germany

Reprint requests to E. v. H.; E-mail: elizabeth.von.hauff@uni-oldenburg.de

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The controlled binding and release of glutamate from overoxidized polypyrrole (PPy) films via a variable potential was investigated. Glutamate-doped PPy films were electrochemically deposited from aqueous sodium glutamate electrolytes containing the pyrrole monomer. The resulting polymer films were found to have a high degree of roughness, which increased with increasing film thickness. This was also found to correspond to an increase in the glutamate content on the PPy film surface. The glutamate content on the film was in the order of  $10^{-8}$  m/cm<sup>2</sup> depending on the film deposition time. Glutamate was then released from the film into the electrolyte through overoxidization of the PPy layer and an applied potential. The amount of glutamate released from the film was greater than that on the surface of the film indicating that glutamate can be released from the PPy film via an applied potential. The switching behaviour of the polymer electrode, i. e. the repeated binding and release of glutamate to/from the polymer film via a variable potential, was investigated. The glutamate content in the samples was detected via liquid scintillation counting techniques performed on samples prepared with tritium (<sup>3</sup>H)-marked glutamate.

*Key words:* Polypyrrole; Ion Selective Electrode; Molecular Switch.