Charging of solid/liquid interfaces is a ubiquitous phenomenon of particular importance in material science. Indeed, interfacial charge density at solid-liquid interfaces was found to be relevant for a number of phenomena such as adhesion, wetting, biocompatibility, separation performances, fouling propensity, etc [1, 2].

Electrokinetic experiments enable the determination of the zeta potential which is defined as the electrostatic potential in the hydrodynamic shear plane separating the solution adjacent to a charged interface into two zones: an inner region where no fluid motion occurs and an outer region where fluid velocity takes non-zero values [3]. Assessing the zeta potential of membranes in various physico-chemical environments is particularly attractive to provide insight into the charge formation process of membrane surfaces and also because zeta potential is correlated with the mechanism of rejection of charged solutes.

Zeta potential of membranes can be inferred from streaming potential and / or streaming current measurements. Since electrokinetic experiments permit to consider the compensation of the surface charge by the ions of the double layer on the liquid side of the interface, they are particularly useful when investigating problems of practical relevance. Potentialities and limitations of electrokinetic measurements are very often related to the determination and interpretation of the experimental data, which is not unambiguous depending on both the nature and the structure of the solid under consideration. Indeed, several works have pointed out the difficulties associated with the interpretation of streaming potential data for the determination of zeta potential of composite membranes [4, 5]. Alternatively, it has been proposed to measure the streaming current (instead of streaming potential) along the skin layer of membranes since its interpretation is not complicated by surface conductance. However, it has been recently shown that streaming current measurements could be impacted by an additional contribution from the support layer(s) of membrane if these latter are exposed to the hydrodynamic flow during electrokinetic experiments [6].

We will first discuss detailed experimental procedures for reliable electrokinetic measurements of RO/NF membranes and an accurate interpretation of the experimental data. Several membranes have been investigated in this study including conventional thin film composite polyamide membranes and novel polyamide membranes containing ionizable hydrophobes (ex. hexafluoroalcohol group) [7, 8]. Both streaming current and electric conductance measurements have been performed to determine the electrokinetic properties of the membrane surface and those of the underlying support layer(s), separately [6, 9]. Eventually, we will demonstrate that the advanced experimental procedures open new perspectives for important issues in membrane characterization such as membrane functionalization, ageing of polymer membranes or fouling.

**Key Words:** Electrokinetics, Streaming current, Electric conductance
References