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Supercritical Angle Fluorescence Technology: A high resolution tool to detect affinity binding, adsorption and aggregation at artificial and cellular surfaces

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Abstract

Supercritical Angle Fluorescence (SAF) Microscopy has been developed for observing fluorescence signals generated at different surfaces. In particular fluorescently labeled biomolecules can be detected with very high sensitivity (even down to single molecules) and high spatial resolution (in axial direction down to a few nanometers) even in presence of many emitting fluorophors. i.e., real time measurements of binding processes are possible. Hence, even kinetic data are available from simple on-step procedures. Further, SAF can be combined with Förster Resonance Energy Transfer (FRET) in order to obtain spatial information of molecular interactions and with Fluorescence Correlation Spectroscopy (FCS). In this presentation we show several examples of application, e.g. the super resolution microscopy in axial direction, the kinetic study of adsorption of proteins at surfaces, an aggregation study of a-synuclein inducing plaque formation responsible for Parkinson's Disease, even the movements of aggregates at the surface and simple and low cost method to detect antibody-antigen reactions, i.e. a simple SAFsensor.

Biography

Dr. Stefan Seeger studied chemistry at University of Heidelberg/Germany and the Technical University Berlin. In 1992, he earned his PhD degree. Further, he studied Business administration at University of Hagen/Germany and the London School of Business and Finance. After working as postdoc at the University of Lund/Sweden, he finished his habilitation and was appointed as a professor for Biosensors at University of Regensburg in 1997. Since 1999, he holds a chair for physical chemistry at University of Zurich/Switzerland and during this time he served as director of the Institute for Physical Chemistry and head of the chemistry department. Stefan Seeger is vice president of the Scientific Research Foundation of the University of Zurich, board member of the Paul-Karrer-foundation, and of the editorial boards of the "Journal of Business Chemistry" and "Advances in Physical Chemistry". Beside several lectures in Physical Chemistry, Stefan Seeger founded and is in charge of the successfully running bachelor and master program Chemistry and business administration at University of Zurich.

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