Development of novel surface responsive sensor for cell attachment and mobility

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We have recently embarked on a project aiming at the development of a novel surface responsive sensor for cell attachment and mobility.
Most existing sensors for this purpose require sophisticated dyeing of certain cell components, or expression of fluorescent protein following genetic transfection.
The motivation for this study is the production of facile evaluation of cell-lines health, propagation or response to various chemical, environmental or pharmaceutical exposures.
Polydiacetylene (PDA) films can be either in metastable "blue", or the stable "red" phases. Many external triggers induce the blue to red transformation, for example, heat, high pH, dehydration or mechanical shear-stress, to name a few.
Adhesion of cells to surfaces through cytoskeletal focal points, induce stresses to the substrate.
In this project we design PDA responsive surfaces onto which cells will be adhered and tested for the force applied on the PDA. The PDA phase transformation will be monitored by fluorescence examination.
Presently different variants of PDA surfaces are prepared and tested for their suitability for the essay.
In particular, in order to make this assay suitable for high-throughput screening, we develop alternative deposition methods to classical Langmuir films. Specifically, a ternary chloroform-water-acetone solvent system was developed from which high quality PDA films are deposited on a surface by applying single drops.