Title:	Detection of creatinine using surface-driven ordering transitions of liquid crystals
Authors:	Verma, I. (/jspui/browse?type=author&value=Verma%2C+I.) Sidiq, S. (/jspui/browse?type=author&value=Sidiq%2C+S.) Pal, S.K. (/jspui/browse?type=author&value=Pal%2C+S.K.)
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Abstract:	Determining creatinine levels in blood is of great importance in the detection of high risk for renal failure. Here, we report a simple methodology for real-time monitoring of creatinine employing surface-driven ordering transitions in liquid crystals (LCs) by changing pH in presence of creatinine deiminase enzyme. It is found that when 5CB (4-Cyano-4'-pentylbiphenyl) LC doped with 4'-hexyl-biphenyl-4-carboxylic acid, a bright optical appearance was observed (at aqueous–LC interface) which is not disturbed in presence of creatinine, consistent with a planar/tilted orientation of the LC molecules at those interface. Interestingly, in presence of creatinine deiminase, an ordering transition was observed resulting from enzymatic reactions (giving rise to NH4+ ions) that can change the local pH values and lead to dark optical appearance of the LC. Presence of different amounts of creatinine would lead varied ordering transition that can be monitored in real time in presence of creatinine deiminase. Our approach could detect the creatinine levels as low as that of the healthy adult (~50 μM) and can be successfully applied to measure higher concentration of creatinine in real time using dynamic optical response of the LC.
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