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## Measure the DNA double labeling efficiency by fluorescence correlation spectroscopy

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Double-stranded DNA (dsDNA), fabricated by annealing of complementary single-stranded DNA (ssDNA) labeled with the same fluorescent dyes results in the coexistence of dsDNA molecules labeled with one or two dyes. Existing methods are insufficient to measure the percentage of the doubly-labeled dsDNA component in the fluorescent DNA sample and cannot even distinguish the doubly-labeled DNA component from the singly-labeled component. We presented a method based on fluorescence correlation spectroscopy (FCS) technique to measure the percentage of doubly-labeled DNA. In each method, we added known amount of unlabeled and imperfect labeled ssDNA and perform annealing on such DNA samples to obtain dsDNA. Next we measured the FCS autocorrelation function of the resulting dsDNA samples. After we fitted amplitudes and triplet state proportion from the FCS autocorrelation curves, we were able to calculate the percentage of doubly-labeled DNA in the total fluorescent component, which is defined as DNA double labeling efficiency (DDLE). We evaluate the precision of our method by the amplification of coefficient variation from the original experiment data to the measured double labeling efficiency. We expressed the amplification of the coefficient variation as a function of labeling efficiency of ssDNA and also as the measured doubly labeling efficiency. We find that the method is more precise with  $c$  increasing. The measurements need only femtoliter volume of dsDNA samples of nanomolar level of concentrations and cost tens of minutes to complete measurement.

### Biography

Sen Hou has completed his PhD from Nankai University, China in 2009 and then become an Assistant Professor in Institute of Physical Chemistry, Polish Academy of Sciences Poland. He has published more than 40 papers in reputed journals and has been serving as a regular reviewer for reputed journals. He is a Biologist and is active in the cross-field of Chemistry and Physics.

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