

# Cellulose Nanocrystals and Poly (N-isopropylacrylamide) For Hydrogen Peroxide Based Biosensors

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## POSTER

Hydrogen peroxide ( $H_2O_2$ ) is a cellular byproduct of many enzymatic catalyzed oxidative metabolism processes. As one of the more stable and prevalent naturally occurring reactive oxygen species, it has been implicated in cell proliferation, aging, and death, as well as signal transduction. Physiological increases in oxidative stress has biologically been linked to diseases of central nervous system such as Alzheimer's and Parkinson's. As such development of rapid, accurate, selective, sensitive, and highly miniaturized  $H_2O_2$  biosensors are of importance for in vivo and in vitro monitoring of  $H_2O_2$ . To mitigate the complexity of analysis in biological matrices, the selectivity of biosensors is impacted by immobilization of enzyme specific to analyte, on a carefully selected membrane, with ability to have high enzyme loading. Our research revolves around the use of biocompatible polymers such as cellulose nanocrystals and poly (N-isopropylacrylamide) hydrogels as effective enzyme supports, both of which will be demonstrated as suitable platforms for building  $H_2O_2$  biosensors. The materials will also be demonstrated in fabrication of other biosensors for glucose, lactose, cholesterol, etc. whose corresponding enzymatic reaction product is  $H_2O_2$ .