

Bengaluru scientists pave the way for novel glucose sensors

Diabetes has become the most prominent health disorder due to changes in modern life styles. Fluctuation of blood sugar levels is an unwanted condition in any diabetic patient and accurate estimate of sugar level is critical in prescribing appropriate medication.

Scientists from the Centre for Nano and Soft Matter Sciences (CeNS), headed by Dr. H.S.S. Ramakrishna Matte have developed a material which can pave ways for efficient and affordable glucose sensors to reduce the overestimation of glucose levels. CeNS is a Bangalore based autonomous institute of the Department of Science and Technology (DST).

They have used materials engineering for the purpose. The team of scientists found that when nickel to iron ratio is 2:1 it favors oxygen evolution and upon changing it to 4:1 it prefers glucose sensing with minimum interference. The experimental observations are supported by computational simulations carried out by Prof. Sang Uck Lee's group from Hanyang University, South Korea.

For developing the sensor, team used layered double hydroxides (LDH). The ability of LDH to change the metal ratios has been used for differentiating oxygen evolution to glucose sensing.

These findings are reported in *ACS Applied Materials and Interface*. (Sreejesh Moolayadukkam, et al. ACS Appl. Mater. Interfaces 2020, 12, 6193-6204).

Materials scientists have been trying to develop electrocatalytic materials (enzyme less/ non enzymatic) for glucose sensors which are believed to be less expensive and more efficient. Often, during the non enzymatic sensing of glucose in blood, water molecules in the blood are dissociated to oxygen by the same electrocatalyst which results in overestimation of the glucose levels. Thus, interference from the oxygen evolution is a critical issue to address.

There are different sensors currently available in the market which functions mainly on enzymatic mechanisms. A major foreseen setback for these sensors is the vulnerability of functional damage due to environmental changes like temperature etc. and thus making them expensive as well. The material developed by scientists from CeNS can help develop sensors that can address such challenges.

