Adding Colour to Ion-Selective Sensing

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Ion-selective sensors typically rely on a receptor composition comprising an ionophore and an ion-exchanger embedded within a plasticized polymeric matrix. These components are generally not optically active, resulting in conventional electrochemical, potentiometric ion-selective sensors that are colorless.

Incorporating dyes into ion-selective membranes presents an attractive challenge, potentially enabling the extension of highly selective sensors to other detection modes, such as absorption (colorimetry) or emission (fluorimetry). Even more challenging is achieving this enhancement without disrupting sensing performance or inducing undesired pH sensitivity. This can be accomplished using Nile Blue and/or Nile Red dyes [1].

The inclusion of these dyes in ion-selective membranes offers several advantages, including the ability to record ratiometric signals. Furthermore, it enables tracing of sensor pretreatment [2] and utilizing this process as an analytical signal itself [3].

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