

Development of “Frightened/Startled” (Near-Miss Accident) Sensor

We developed a technique to detect occurrences of "frightened/startled" situation, in which a worker feels the strain, fright or surprise at dangerous working conditions, such as construction site. The situation is detected as characteristic changes of workers physiological states, measured continuously by wearable sensors. To estimate the tendency of physiological responses in "frightened/startled" situation, we performed experiments using virtual reality system.

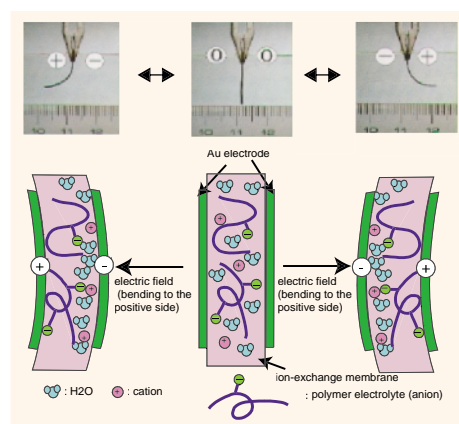


Virtual Reality System

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Research and Development of Artificial Muscles

The purpose of our research is to develop soft and wet-actuator as a candidate of artificial muscle. In 1991, ion-exchange membranes plated with noble metal have been found to bend in response to low voltage by our group. The response is quick and durable. The mechanism for electro-responsive bending motion has been analyzed. Based on the mechanism, the performance of the bending has been largely improved. In order to prepare multi-direction bending actuator, a tubular ion-exchange membrane was used. The surface of the tube was repeatedly chemically plated with gold and was cut four grooves by laser beam to form electrodes, which become to bend all the desired direction. By using the tubular actuator, a moving catheter for brain surgery is developing.



Photograph of the bending motion of the perfluorocarboxylic acid membrane / Au composite in response to 2V voltage in distilled water, and the response model in which the bending motion is attributed to the water flow associated with the ionic current.

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