



Educational Lecture

Advanced Achievement of Microelectric Fields' Measurements and Potential Applications for Living Organisms

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Abstract: The biosensors of sharks that detect minute electric field generated by living prey are a great mystery. This implies that supersensitive detections are being achieved without grounding, which cannot be achieved even with our latest technologies. However, we succeeded in creating a prototype of a new element on the basis of an understanding developed from the structure of a shark's electric field sensor. Furthermore, we developed a new visualization technology that seeks out the generation of a quasi-electrostatic field on the surface of substances and living organisms by shooting light, such as a laser beam. This technology can be used not only to visualize the electrical characteristics of surfaces but also the interior of physical objects.

Keywords: Quasi-electrostatic field, Multipolar structure, Reference potential, Smart Reference, Laser, Quasi-electrostatic sensing

要旨: サメが生餌の発する微弱な電界を検知する生体センサには、大きな謎がある。それは最新テクノロジーでも到底実現しえない超高感度を接地なしに実現していることである。我々はサメの電界検知器の構造にヒントを得て新しい素子の試作に成功した。またレーザー光等の照射によって物質や生体の表面に準静電界の発生を見出し、それを用いた新しい可視化技術を開発した。これは表面だけではなく対象物内部の電気特性を可視化できるものである。

Keywords: 準静電界、多重極構造、基準電位、スマートリファレンス、レーザー、準静電界検出