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Characterization and Electrochemical Study of Nano-Composition Based Methylene Blue- and Riboflavin-Nafion on the Surface of Gold Electrode

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Abstract: A functional membrane, composed of the nanoparticles of methylene blue (MB) and Nafion, was constructed during the present study. The materials were characterized by the methods of scanning electron microscopy (SEM), transmission electron microscopy (TEM), and UV-Visible and FT-IR. The average diameter of new nano-particles was estimated to be about 60 nm. A novel Nafion-riboflavin membrane was also constructed and characterized by the methods of SEM, TEM and UV-Visible spectroscopy. The estimated average diameter of the new nanoparticles was about 60 nm. The functional membranes of Nafion-riboflavin and Nafion-methylene blue showed a quasi-reversible electrochemical behavior, on the gold electrode, with a formal potential of $-562 \text{ } \mu\text{m}^5$ and $-305 \text{ } \mu\text{m}^5 \text{ mV}$ (vs. Ag/AgCl), respectively. Some electrochemical parameters were also estimated, indicating that the systems present good and stable electron transfer properties. Our data proved that Nafion can be an interesting and helpful material in constructing Nanoparticles of different electro-active materials and in their stable immobilization.

Key Words: Riboflavin, methylene blue, Nafion, electrode, characterization, nanoparticles.

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