

Dynamical Model of Binding Control between Biomolecules Based on Au/Ni/Au Rod in Magnetic Field

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Protein Immunohistochemistry is widely used in medical science. Integration of the probe and target biomolecules generally results from one or more non-covalent interactions. Therein nonspecific binding with similar interaction performance as specific binding in protein immunohistochemistry can produce high background noises, resulting in inconclusive target elucidation that hinders interpretation. Due to nano-fabrication, a rod-shaped hybrid of Au/Ni/Au with good magnetic performance was designed and used by our group as biomolecules substrates. Results showed that the magnetic field influenced interactions between biomolecules. In addition, as the non-covalent interactions can be influenced by environmental conditions, we also studied the influence of block agent, temperature, pH, salt conditions and binding time. Interestingly, higher Accuracy appeared at the high magnetic field, where stronger magnetic field caused higher vortex speed of reaction solution, which means nonspecific binding can be largely replaced by specific binding due to molecular physical interactions.