Observation of ESR-STM phenomenon on the example of TEMPOL and TEMPO organic compounds containing free radicals

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So far only some researches have been devoted to the use of STM for single spin detection [1, 2]. This technique is called ESR-STM (Electron Spin Resonance — Scanning Tunneling Microscope). ESR-STM signal measurement is based on observation of tunneling current modulation in STM appearing under influence of object spin rotation placed in the magnetic field. For the first time such an experiment was conducted by Mannasen in 1989 for oxidized silicon surface. The analysis of tunneling electron interaction with the rotating spin process carried out in theoretical works [3] suggests that the signal is so weak that its registration may is a very difficult experimental task.

We believe that we obtained the spin signal using STM working in air and room temperature. We show some results of our investigations on spin effects accompanying this type of interaction with such an organic substance surface as TEMPO and TEMPOL (Fig. 1) containing a considerable amount of free radicals concentration.

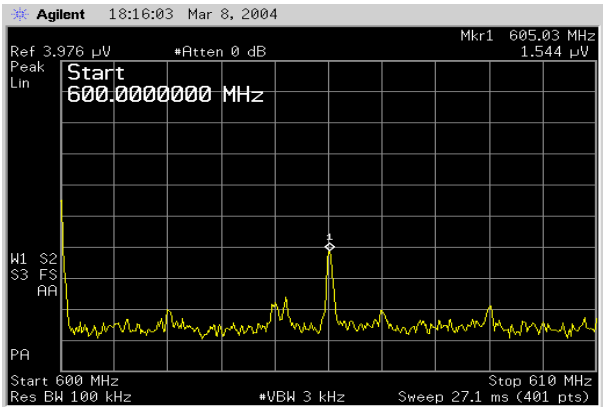

Fig. 1. HF tunneling current spectrum for TEMPOL.

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