ESR-STM measurement of single molecule magnet (SMM)
-Toward spin manipulation of SMM-

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Molecule-based architecture achieved by coupled with its nearest neighbor localized spin mediate with the delocalized S = 1/2 π-radical electron is one of the promising candidate for quantum information processing (QIP), which can approach towards the elaboration and accumulation of a quantum bit (qubit) to overcome the intrinsic challenges in QIP of the entanglement and scalability improvement. Among a number of molecules, so-called single-molecule magnet (SMM) is one intriguing target that can exhibit the long spin relaxation/coherence times of the electron/nuclear spins localized in metal ion with magnetic anisotropy and electrical accessibility to the ion spins through the π-radical electron delocalized at the ligands surrounding the ion. The bis(phthalocyaninato (Pc)) Tb(III) ($TbPc_2$), is one of the best examined cases of SMM in which the delocalized π-radical electron spin of the Pc ligand plays the key role in reading and intermediating the localized Tb spin qubits. In this presentation, we report the measurement of electron spin resonance (ESR) of single $TbPc_2$ molecule using the technique of ESR implemented on scanning tunneling microscope (STM) (ESR-STM) (Fig.1) and show the magnetic property of delocalize and localized spin within intramolecule, which can be influenced by the substrate.

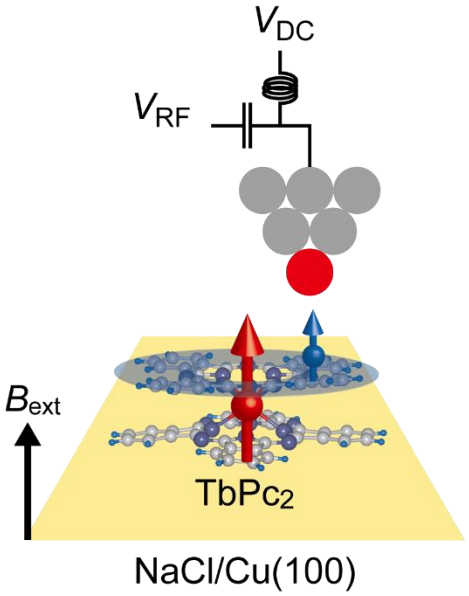

Fig.1 Schematics of the experimental setup. A single TbPc2 molecule adsorbed on a 2 ML NaCl/Cu(100) surface is studied using ESR-STM with an out-of-plane external magnetic field.