The Fluctuating Superconducting Transitions in Granitoids Rock BPY-1 Crystals

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The temperature dependent conductivity had been recorded in georock crystal BPY-1 alongwith RF stimulated Hall effects. The surprising features of the study had been discussed.

Keywords: Conductivity, RF stimulated Hall effect.

1. INTRODUCTION

The electrical, electronic and magneto conduction in geo matters reveal their tremendous resource potentials. The first class of these crystals is Li-R complexes, where R = benzene, naphthalene, pyrene or graphite [1,2]. The second class includes a large number of complexes involving transition metal atoms instead of Li. A known class of porous coordination polymer (PCP) of formula [Cu $(BPY\text{-}1)_2(SiF_6)$] does not exhibit particularly high uptake under the same condition for CH_4, N_2 and H_2O presumably because of its lake of open metal sites [3,4].

2. EXPERIEMTNAL ANALYSIS

The Geo crystals BPY-1 were prepared by cutting the minerals using standard methods and were employed in 4-probe Hall geometry and air drying silver paste was used for making electrical contacts on the samples. The ohmic magneto potential records; transverse & longitudinal currents and temperature dependent DC conductivity have been recorded using NPL superconductivity Lab facility. The sample temperature was monitored with an accuracy of ± 0.1K using a standard 100 Ohm platinum sensor in conjuction with the Keithley 224 programmable constant current source and Keithley 181 nanovoltmeter [5,6].

3. RESULTS, DISCUSSION & CONCLUSION

The transverse magnetic fields under radio frequency excitations in Geo-Rock crystals reveal a dynamic Hall effect possessing induced oscillatory instabilities in the shape of ohmic and magnetopotential records as showen in Figure 1. The oscillatory magnetopotential rises linearly whereas the ohmic oscillatory variation shows sharp peak at f = 5.5MHz.

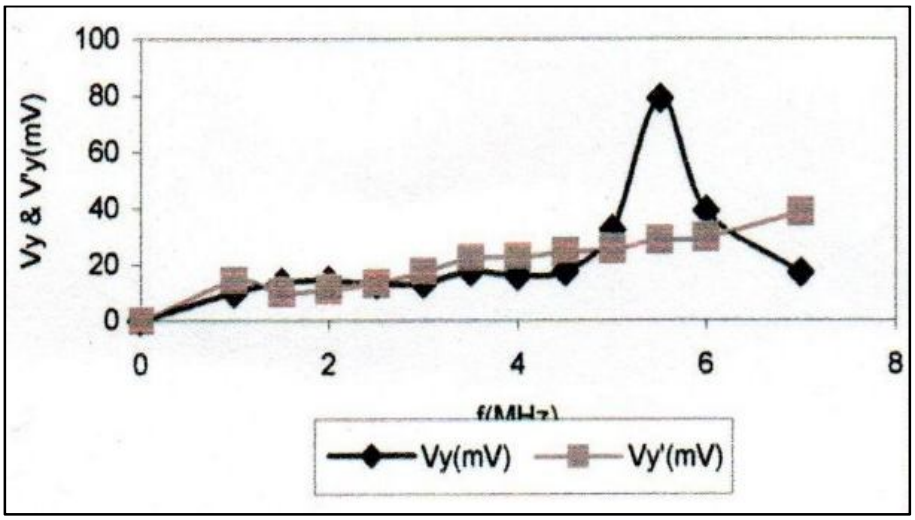

Fig. 1: The MRF stimulated & magnetopotentials in Rock Crystal BPY – 1.

The longitudinal i_x and transverse i_y current (mA range) under MRF excitations has been presented in Figure 2 revealing oscillatory variation in both.

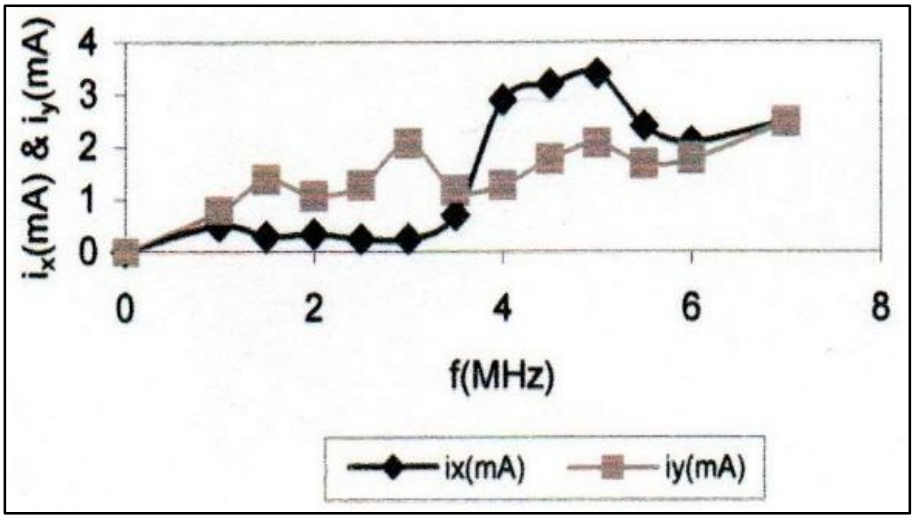

Fig. 2: The MRF stimulated longitudinal & transverse currents in Rock Crystal BPY – 1.

The temperature dependent DC conductivity has been recorded using NPL superconductivity lab facility as shown in Figure 3 depicting fluctuating superconducting trends in low to room temperature range with exciting superconductivity feature neighbouring T_c = 300K. The RF-attachment with temperature dependent conductivity at

low temperatures is in process with an expectation to switch on the superconductivity transition T_c towards room temperature side in Rocks & HTS.

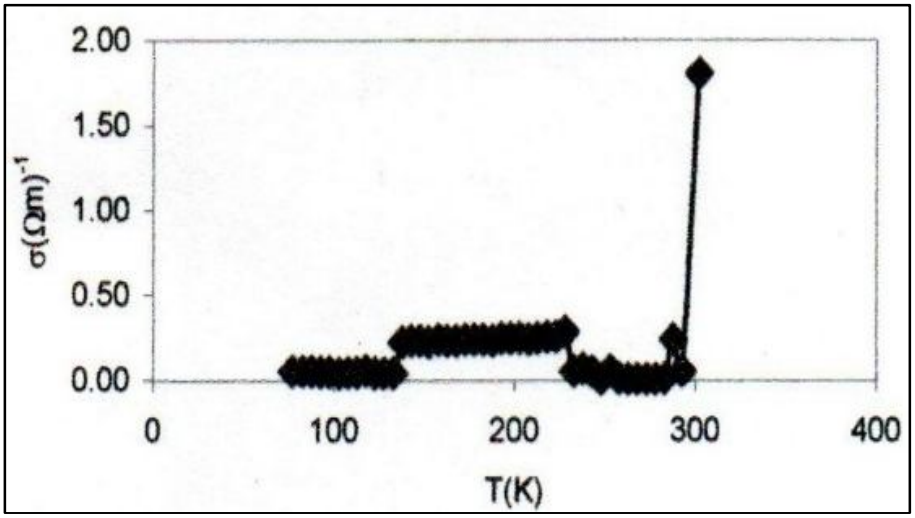

Fig. 3: The temperature dependent electrical conductivity of Rock Crystal BPY – 1.

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