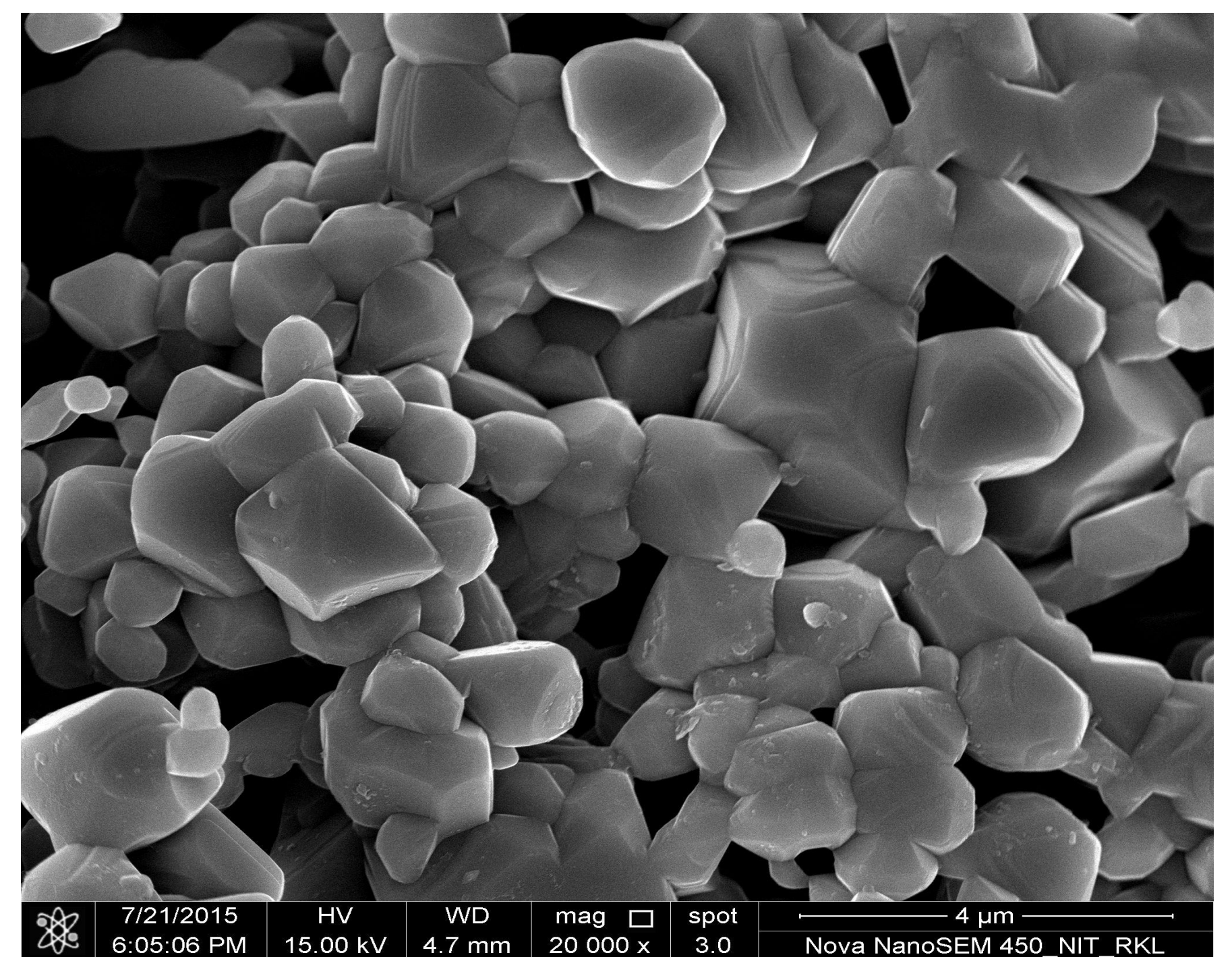
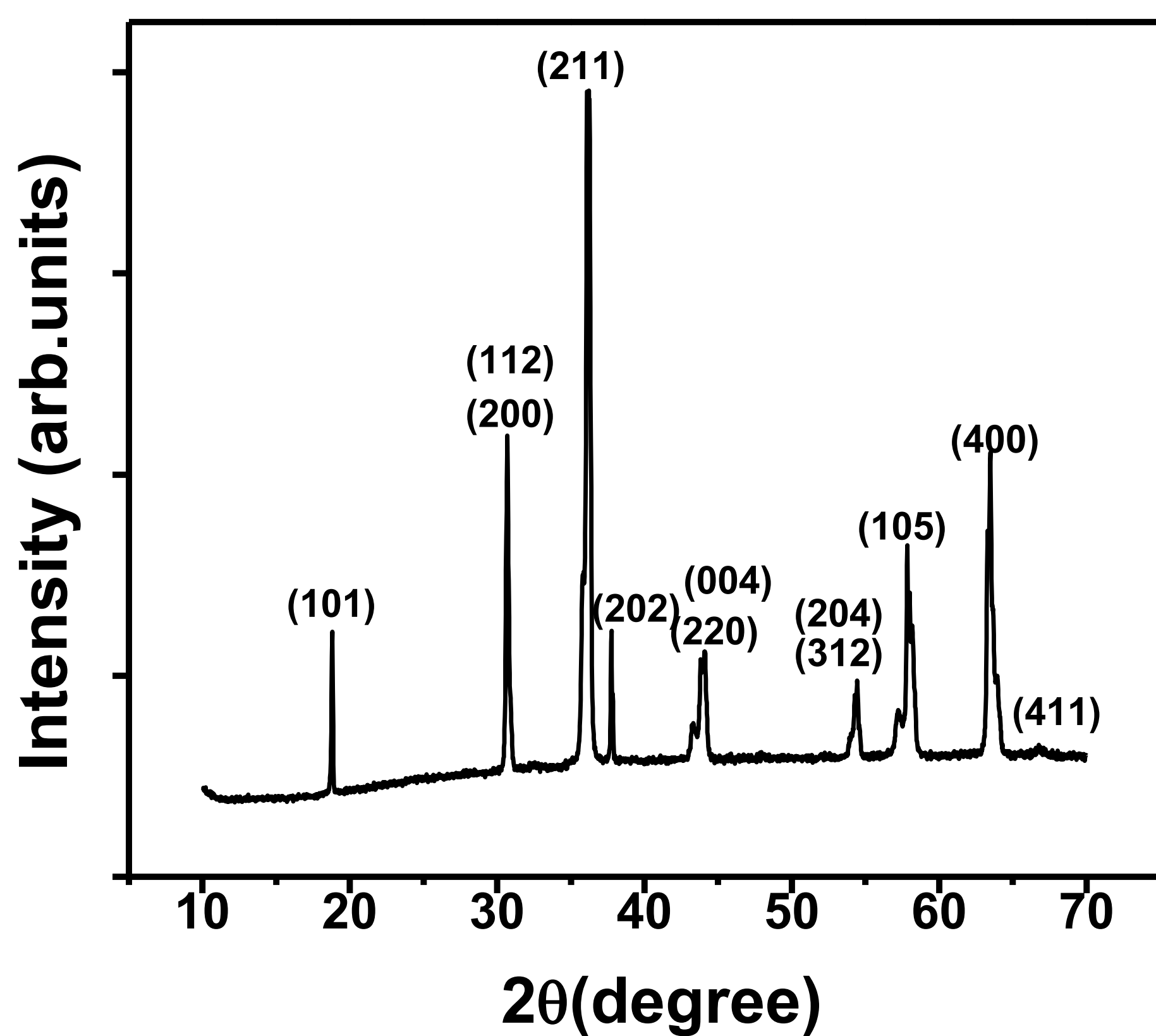


Abstract :- In the present work, we have discussed the electrical transport properties of the polycrystalline NiCr₂O₄ by employing Impedance spectroscopy and DC resistivity techniques. It was observed that charge carriers follow an Arrhenius type conduction throughout the temperature range. Activation energy (E_a) have been calculated from the impedance data, 0.462 eV for R_{gb} and 0.42 eV from R_g , which is well buttressed by the activation energy from the DC resistivity fitted data which is 0.468 eV.

EXPERIMENTAL TECHNIQUES :- Polycrystalline NiCr₂O₄ system was prepared by standard solid state reaction method. The crystal structure and phase identification was determined by the by RIGAKU X-Ray Diffractometer at room temperature using CuK α radiation. Temperature dependent AC impedance in the frequency window of 100Hz-1MHz was measured by HIOKI-IM 3570 Impedance analyzer and DC resistivity measurements were done by the help of KEITHLEY 6517B Electrometer in the temperature range 30-200^o C.

RESULTS AND DISCUSSION

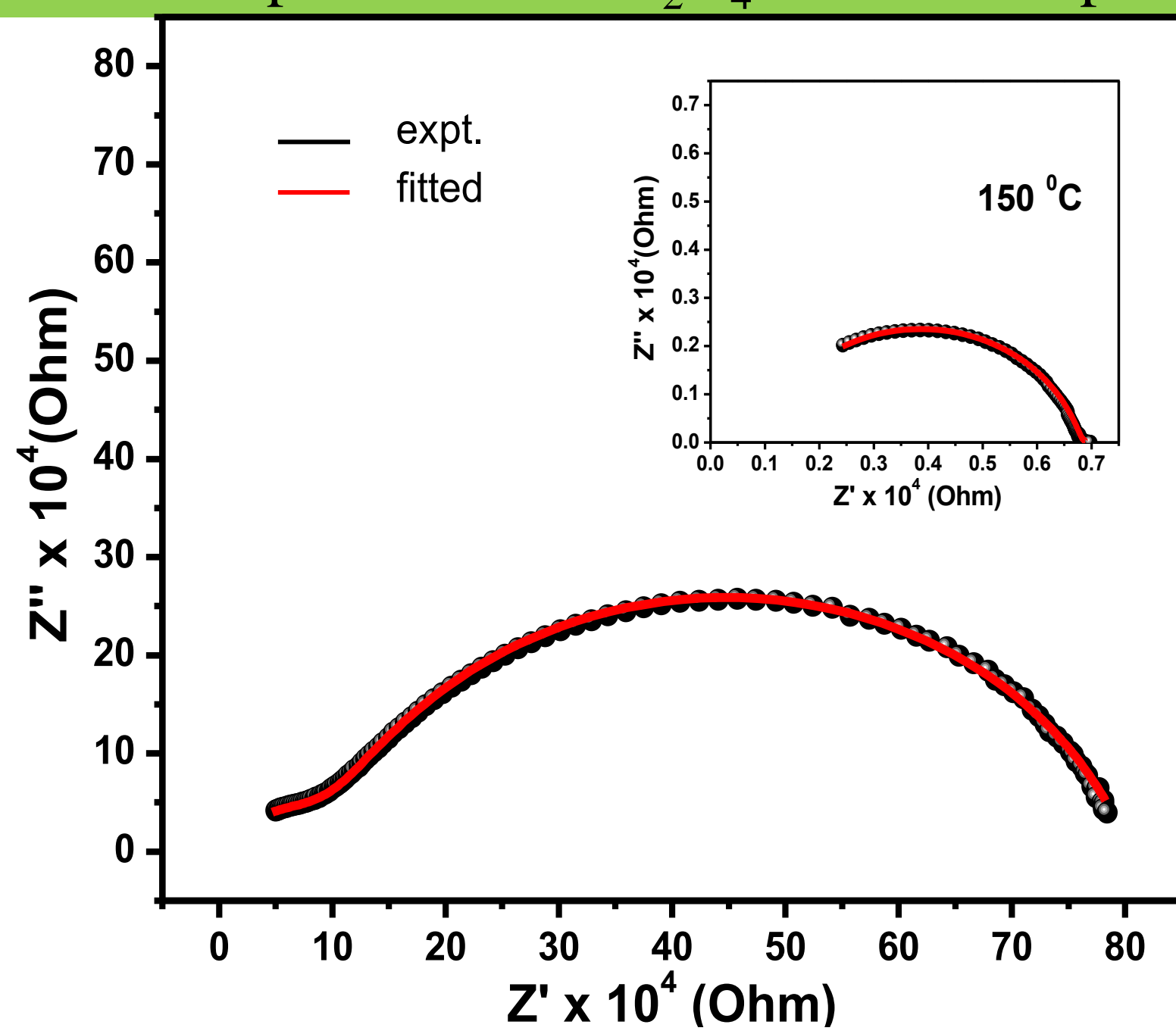
Structure and FESEM



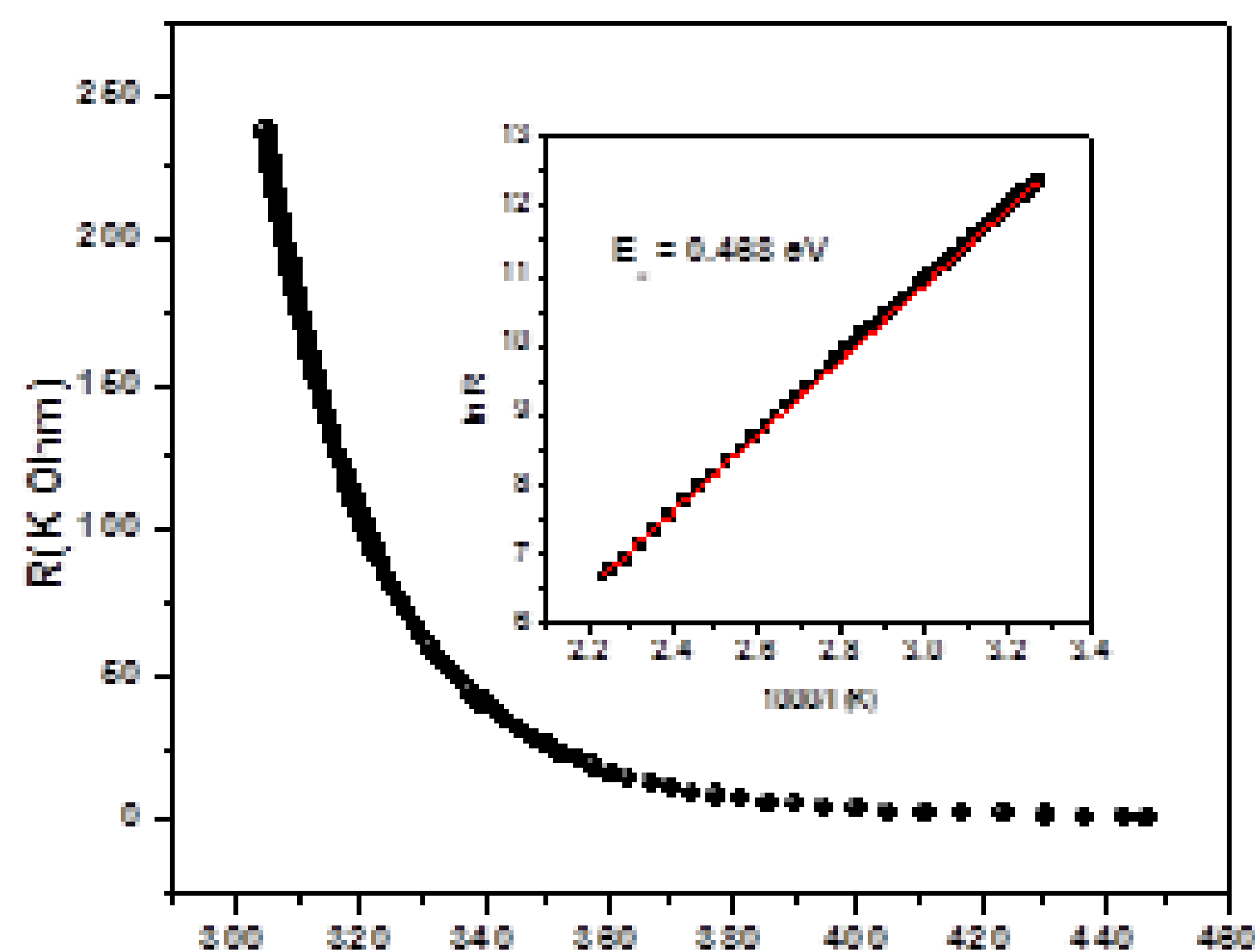
XRD pattern of NiCr₂O₄ at room temperature.

FESEM image of of NiCr₂O₄ at room temperature.

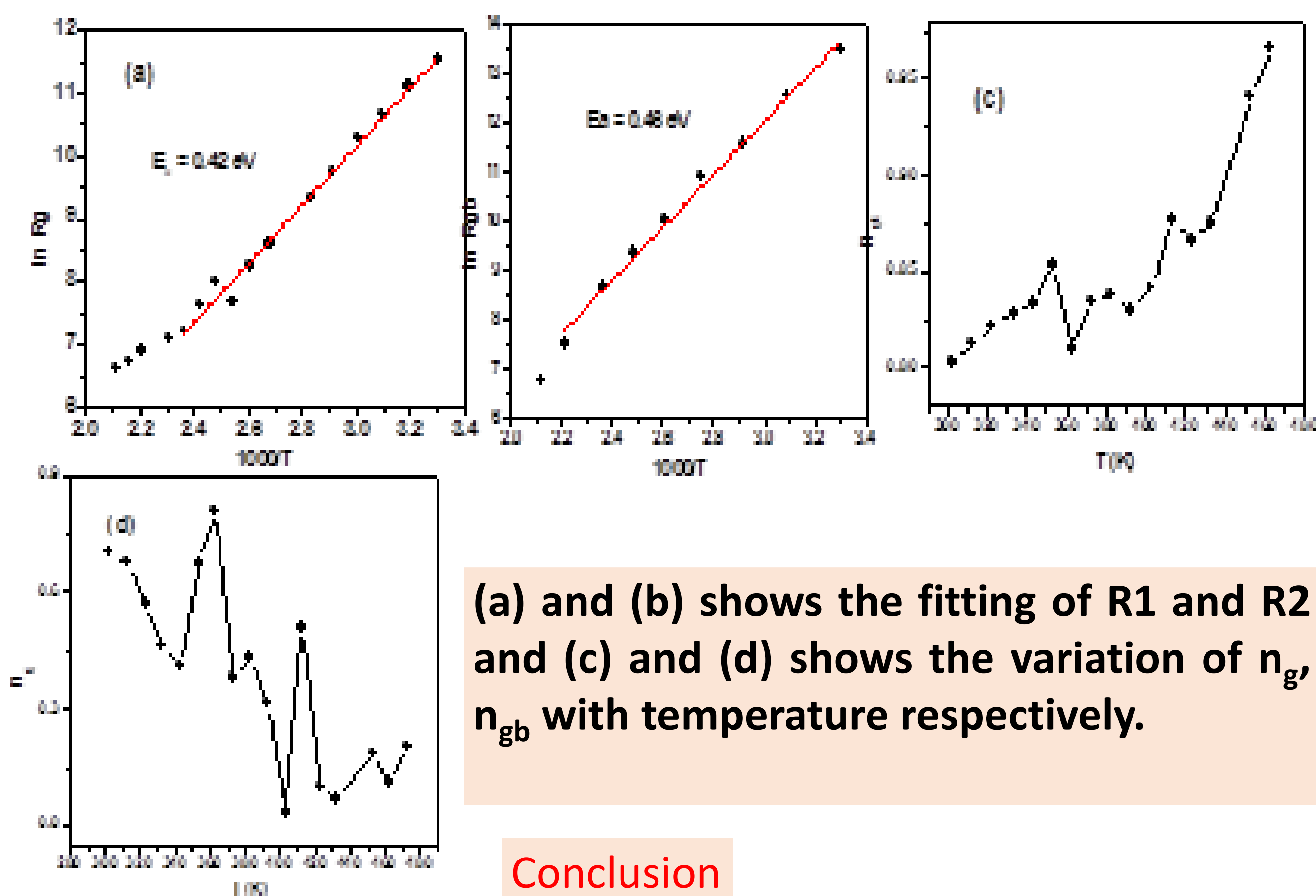
Electric transport properties via Impedance and DC Resistivity



Nyquist plot at 30 °C and 150 °C (Inset)



Variation of R with T. Inset shows graph of ln R Vs. 1000/T. Solid red lines are the line fittings.



(a) and (b) shows the fitting of R1 and R2 and (c) and (d) shows the variation of n_g , n_{gb} with temperature respectively.

Conclusion

We have successfully prepared the polycrystalline NCO having average grain size of 2 μ m. The type of conduction mechanism of the charge carriers were analyzed from both DC resistivity and AC impedance measurement in the temperature regime 30-200^o C. From our analysis, it was found that throughout the measured temperature range the conduction mechanism is purely Arrhenius type which is well strengthened by both the data.

ACKNOWLEDGMENT

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