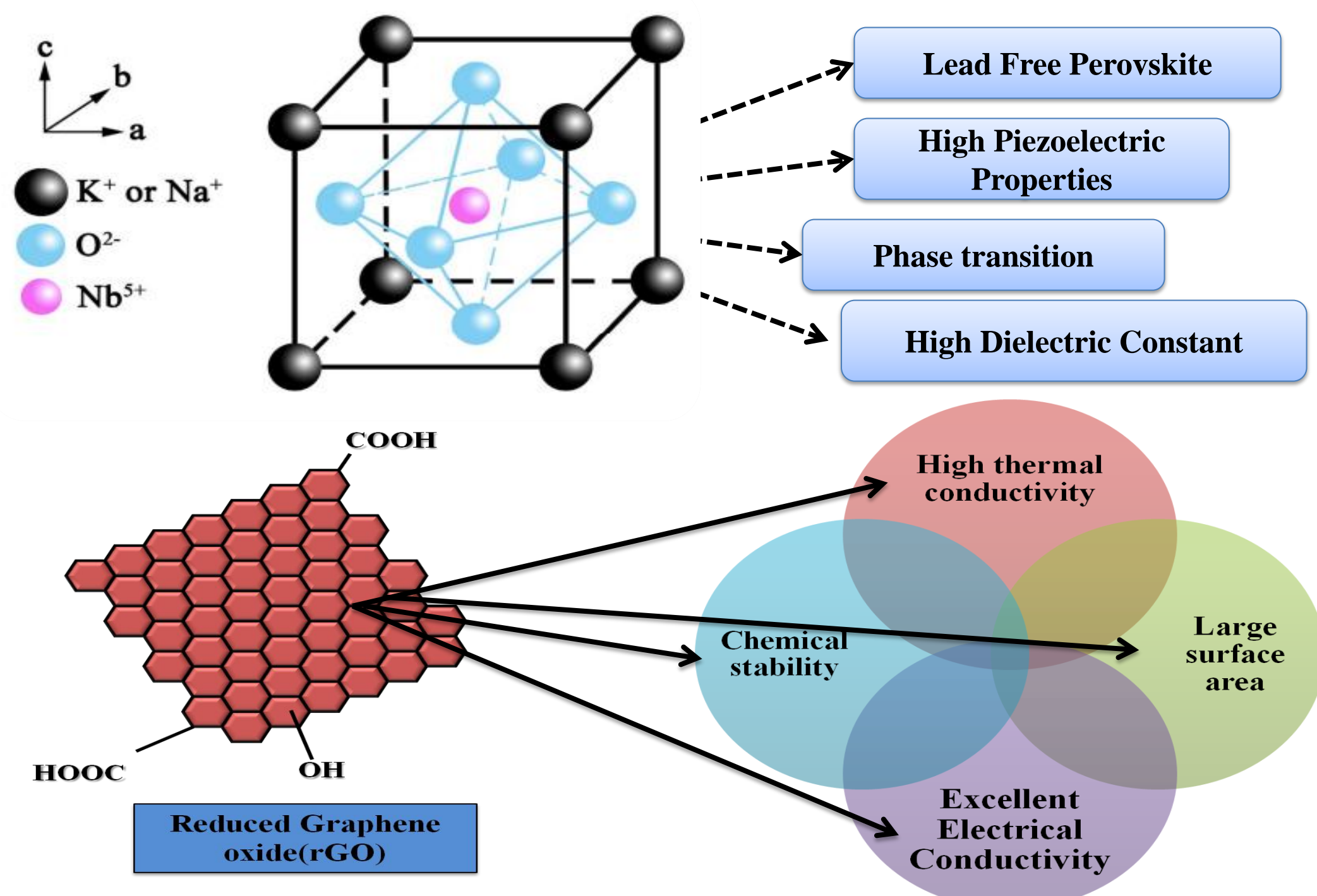


Enhanced structural and dielectric behavior in rGO incorporated $K_{0.5}Na_{0.5}NbO_3$ composite System

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INTRODUCTION & AIM



Aim: To study the effect of rGO incorporation on the structural and dielectric properties of the $K_{0.5}Na_{0.5}NbO_3$ system

METHOD

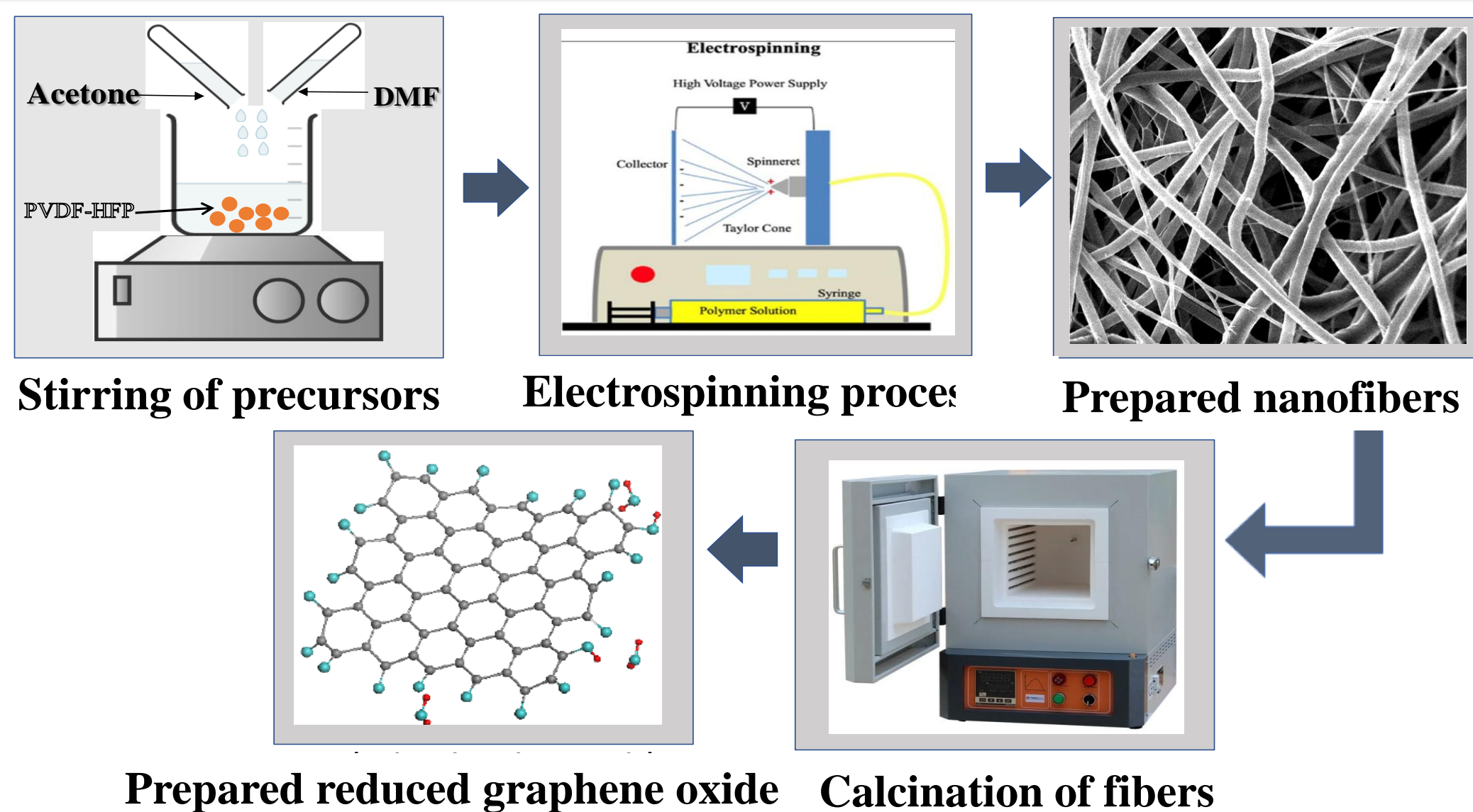


Figure : Schematic representation of the synthesis of rGO.

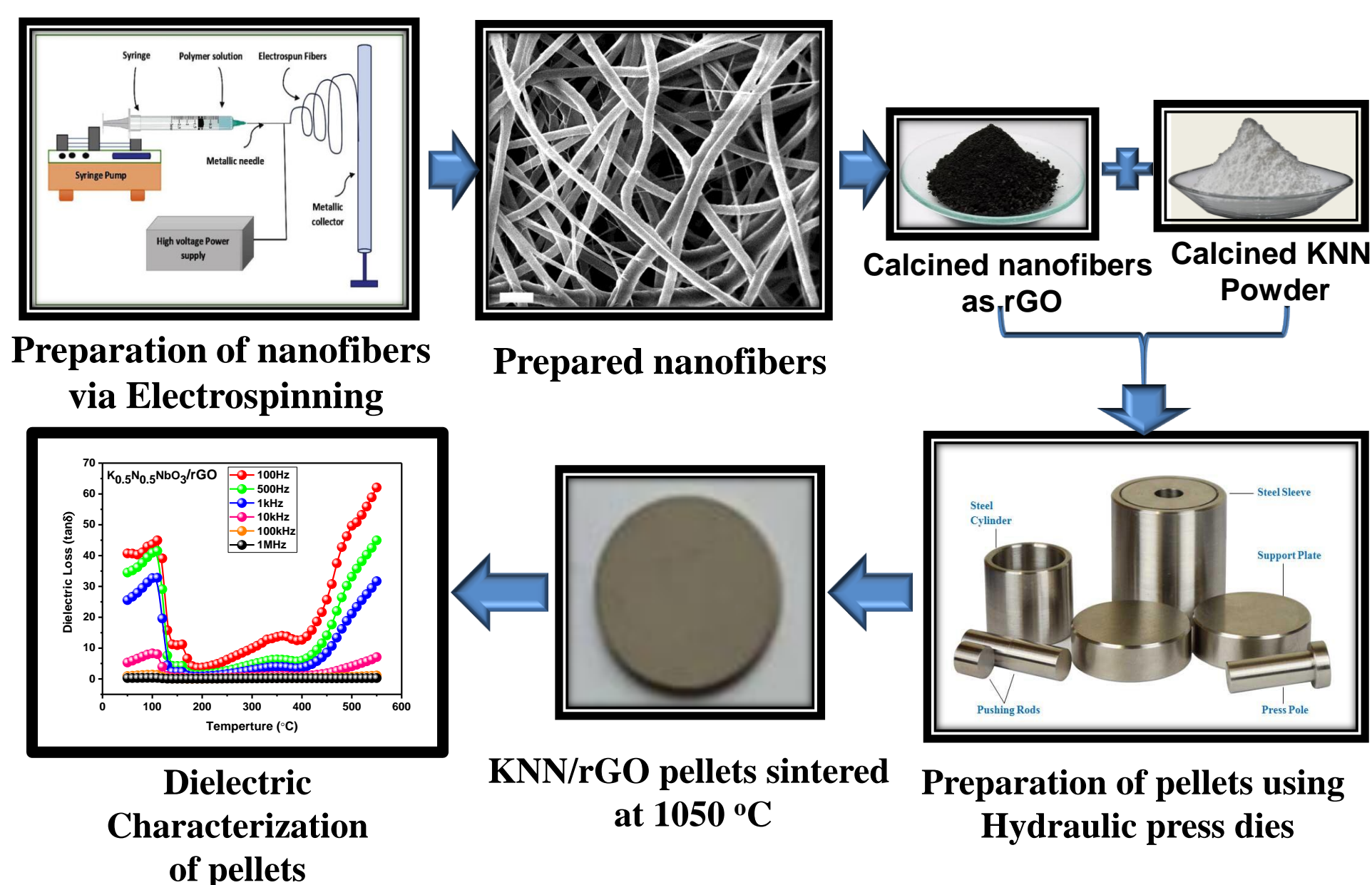
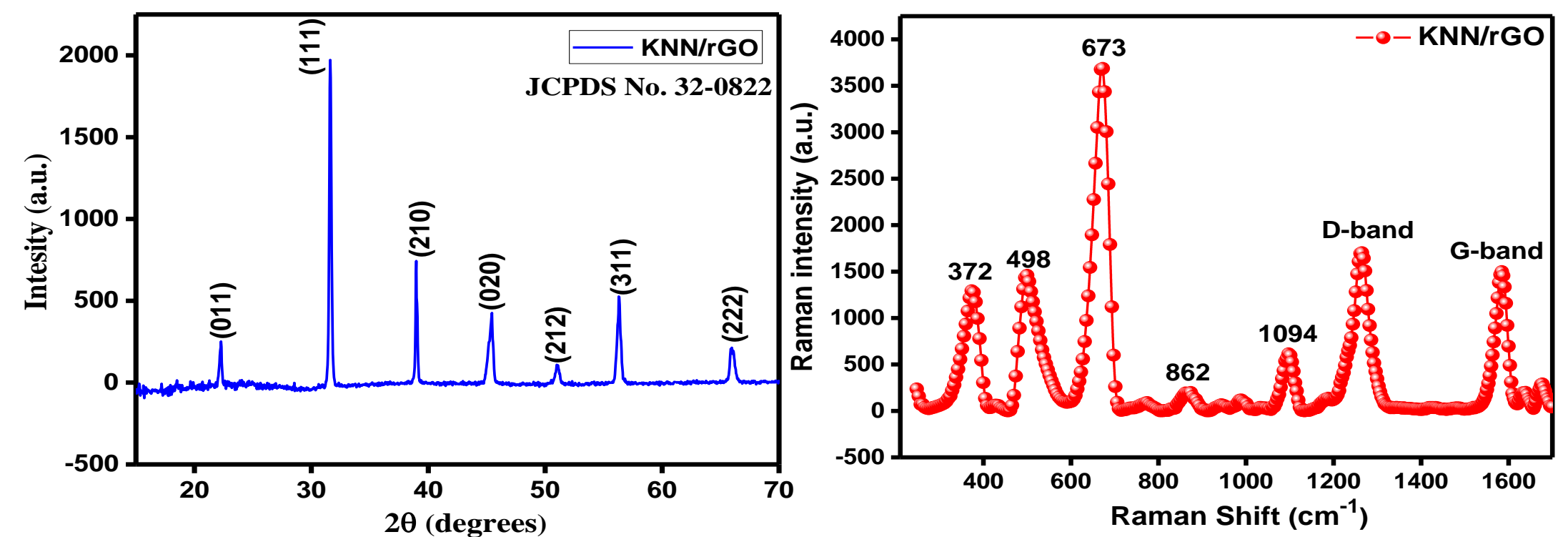
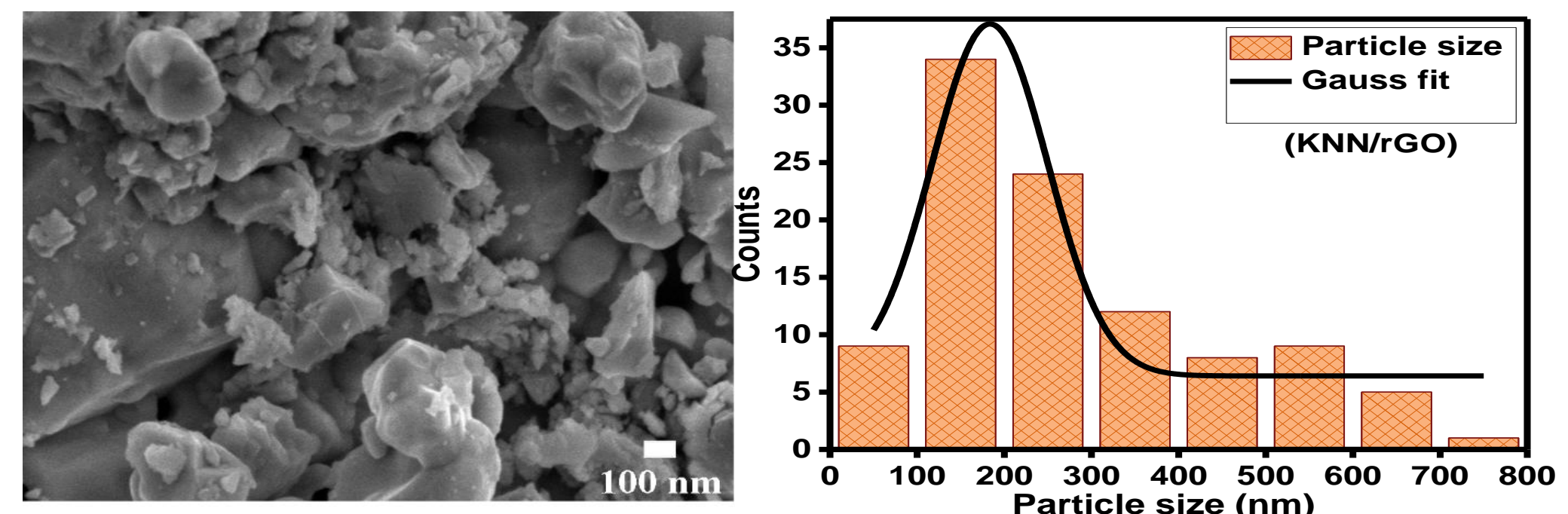


Figure: Schematic representation of preparation of KNN/rGO composite.

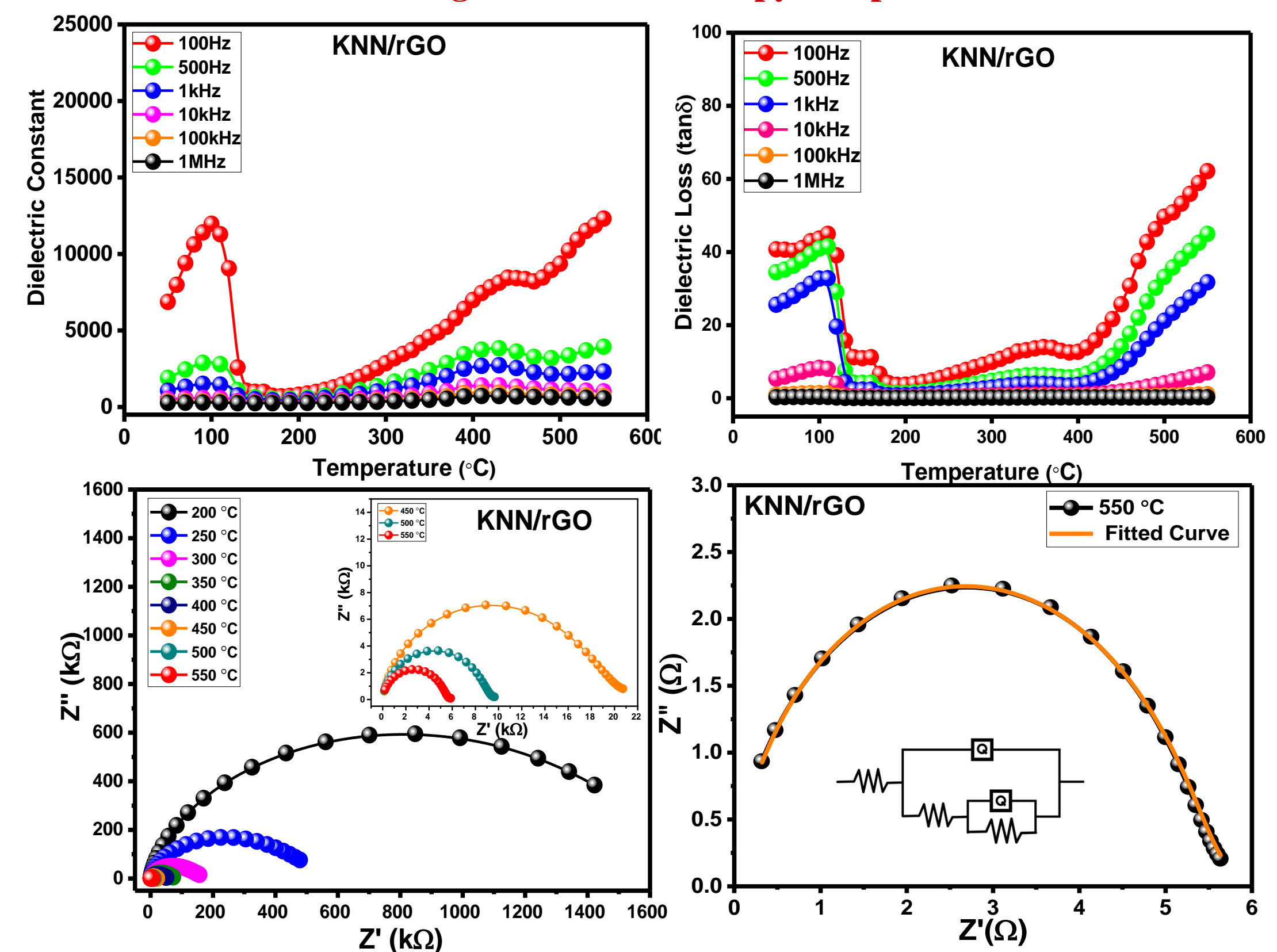
RESULTS & DISCUSSION



X-ray diffraction patterns and Raman spectra



Field emission scanning electron microscopy and particle size distribution



Dielectric constant and Nyquist plots with equivalent circuits

CONCLUSION

Novel lead-free KNN/rGO composites were successfully synthesized using solid-state and electrospinning methods. The incorporation of rGO induced a phase transformation from orthorhombic to pseudo-cubic symmetry and reduced crystallite size. Dielectric constant was significantly enhanced, along with improved grain connectivity and reduced resistance. Overall, rGO-modified KNN exhibits superior dielectric properties, making it a promising candidate for advanced lead-free energy storage applications.

FUTURE WORK / REFERENCES

Future work will focus on optimizing the rGO content to achieve an optimal balance between dielectric performance and microstructural stability. Additionally, further studies will be conducted to assess the scalability of the synthesis process and its integration into energy storage devices.

Bairagi, S. and S.W. Ali, Poly (vinylidene fluoride)(PVDF)/Potassium Sodium Niobate (KNN) nanorods based flexible nanocomposite film: Influence of KNN concentration in the performance of nanogenerator. Organic Electronics, 2020. 78: p. 105547.