ELECTROSPUN PVA-GRAPHENEOXIDE-PEDOT:PSS NANOFIBERS FOR WOUND HEALING

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PVA nanofibers

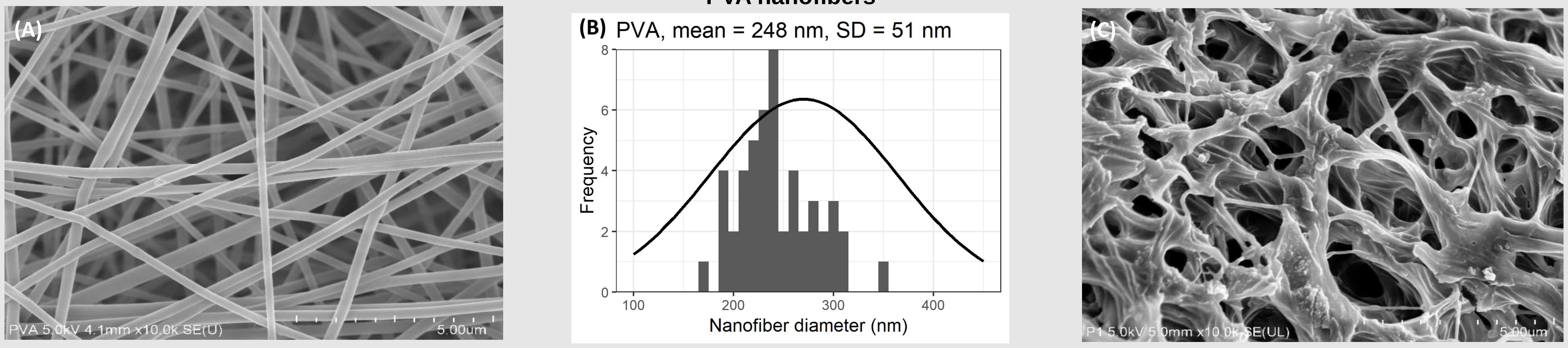


Figure 1: FESEM images and the diameter distribution of PVA nanofibers (A & B) and PBS-soaked PVA nanofibers (C)

PVA-GO nanofibers

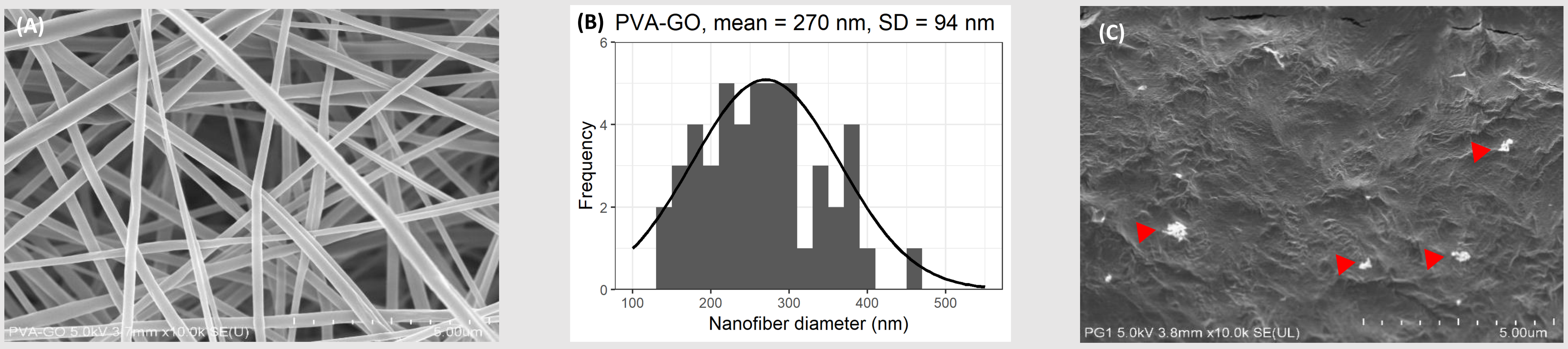


Figure 2: FESEM images and the diameter distribution of PVA-GO nanofibers (A & B) and PBS-soaked PVA-GO nanofibers (C). Arrowheads indicate the aggregation of GO

Nanofibers-based scaffolds

- Highly valued for its mechanical and biological properties [1]
- Challenge: Emulation of architecture of extracellular matrix

Graphene Oxide (GO)

- Drug delivery [2]
- Gene delivery [3]
- Wound healing applications [4].

PEDOT:PSS

- Survival and attachment of primary neural cells [5]
- Drug delivery platform [6].

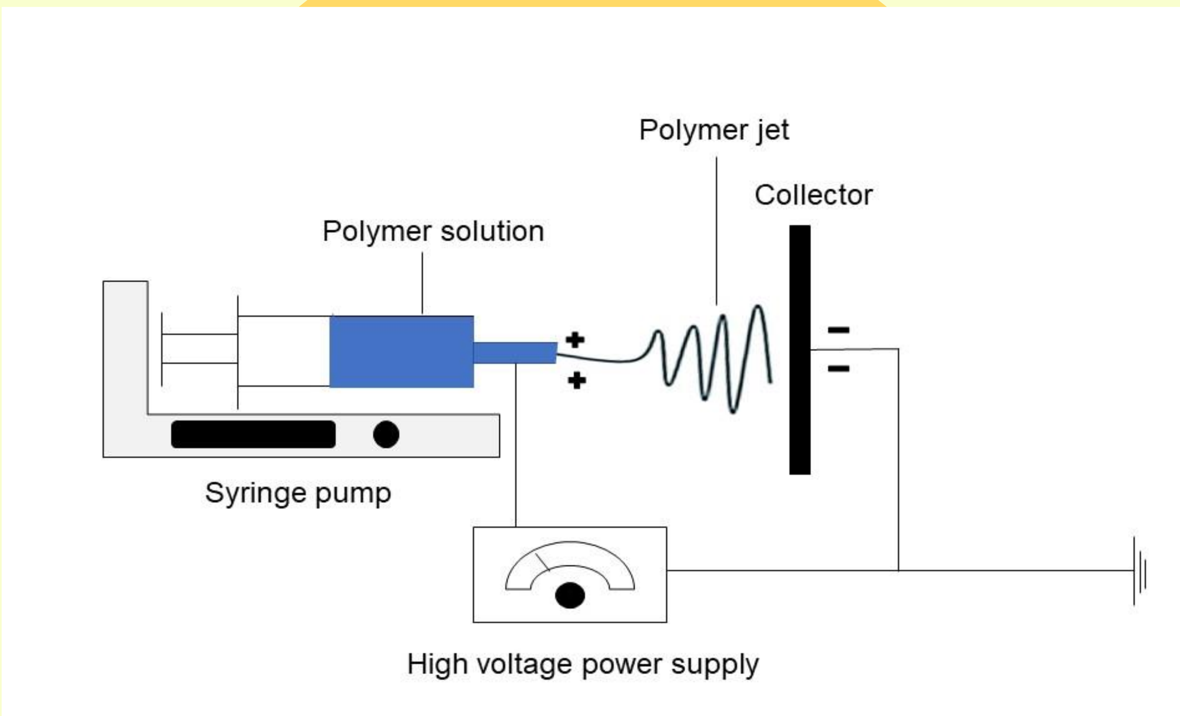


Figure 3: Schematic diagram of electrospinning setup. The apparatus consists of a syringe pump, a spinneret with a metallic needle, and a metal-plate collector. An electric field is applied to the polymer solution to produce a charged jet. The jet travels in the air and eventually evaporates before depositing fine fibers at the metal-plate collector.

METHODS

1. FESEM imaging
2. Tensile strength measurement
3. FTIR spectra
4. Raman spectroscopy

PVA-GO-PEDOT:PSS nanofibers

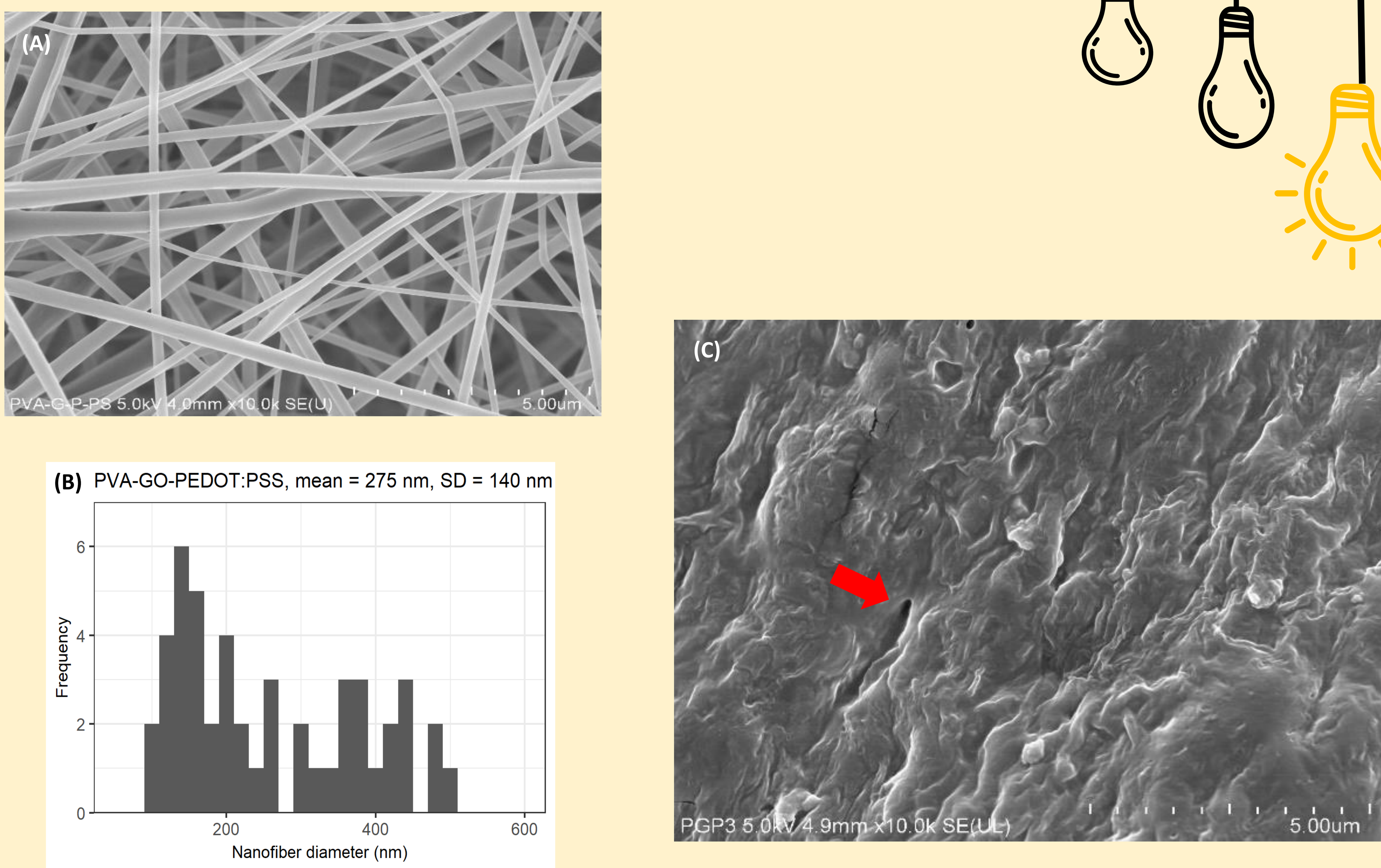
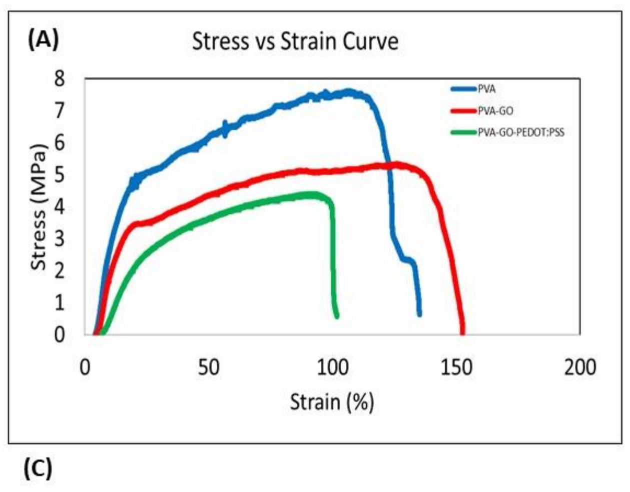


Figure 4: FESEM images and the diameter distribution of PVA-GO-PEDOT:PSS (A & B) and PBS-soaked PVA-GO-PEDOT:PSS nanofibers (C). Arrow shows a small gap is present amongst fibers after soaking in PBS



(B)

Sample	Stress (MPa)	Strain (%)
PVA nanofibers	7.62	135.09
PVA-GO nanofibers	5.33	152.58
PVA-GO-PEDOT:PSS nanofibers	5.99	68.90
Human Skin [7]	5-30	35-115

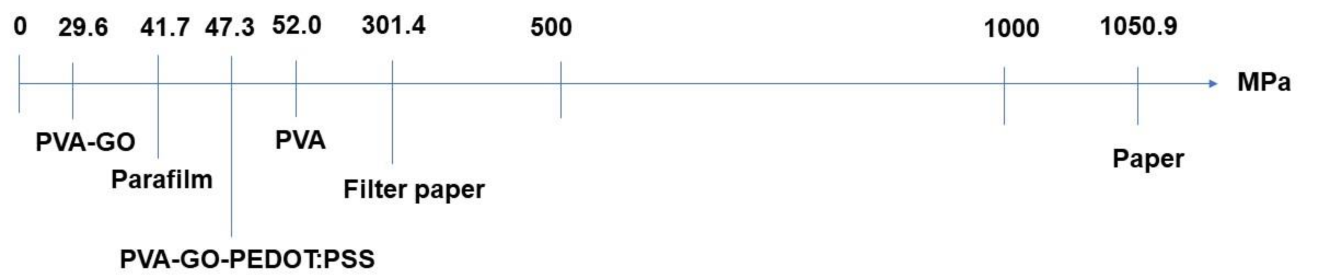


Figure. 6: (A) Stress-strain curves of PVA, PVA-GO and PVA-GO-PEDOT:PSS nanofibers (B) Stress and strain values (C) Young's modulus spectra.

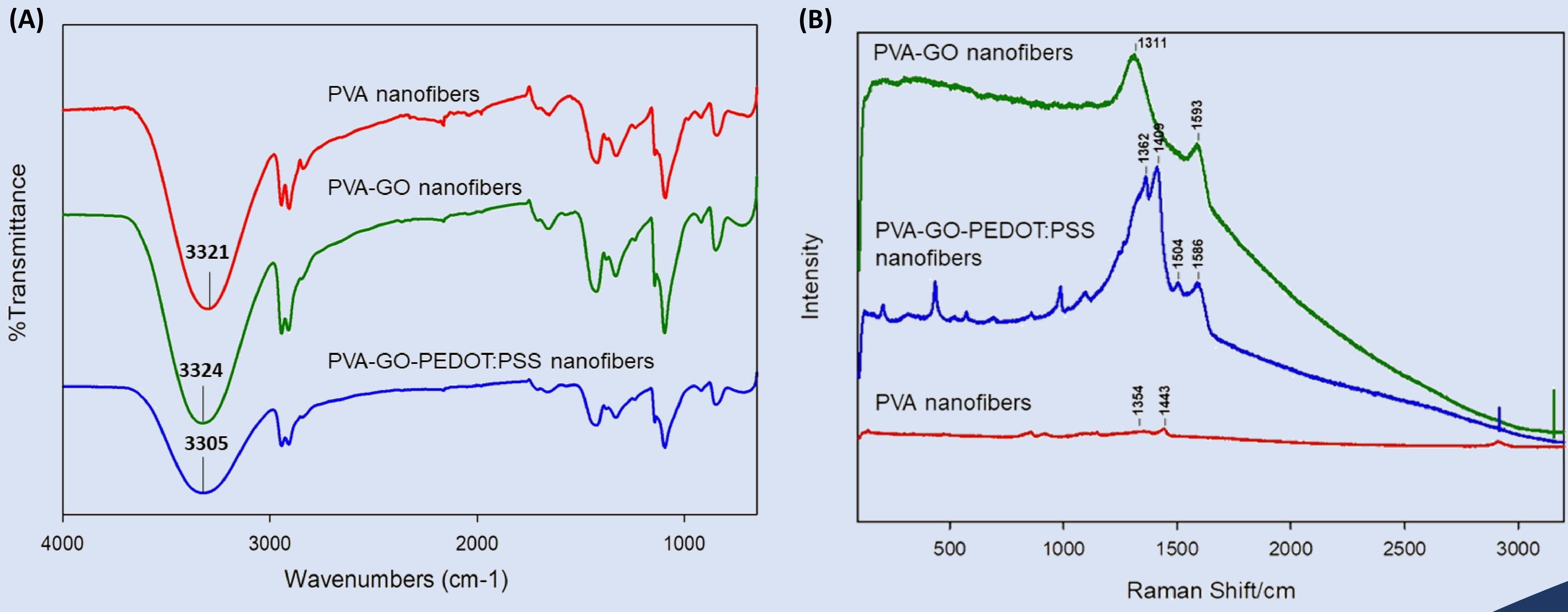


Figure 7: (A) FTIR spectra of nanofibers, (B) Raman spectra of nanofibers

CONCLUSION

- Our study indicate that PVA-GO-PEDOT:PSS nanofiber has similar tensile strength measurement to native skin, while exhibiting a combination of unique property of PVA, GO and PEDOT:PSS.
- We deduce that PVA-GO-PEDOT:PSS nanofiber can serve as a initial template for further modifications and subsequently used to promote wound closure.

REFERENCES

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