

Spray drying process to make modified cellulose into powder form

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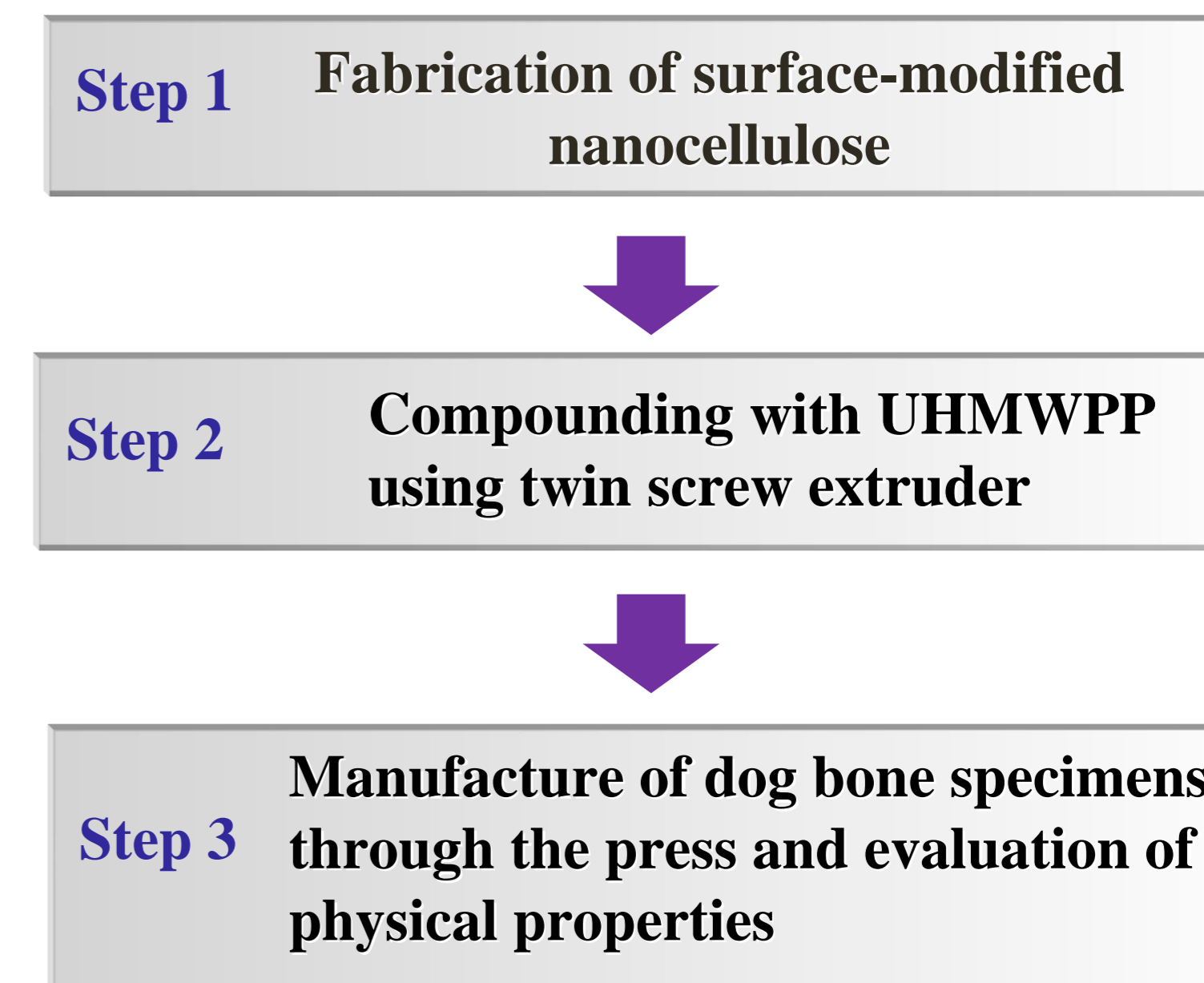
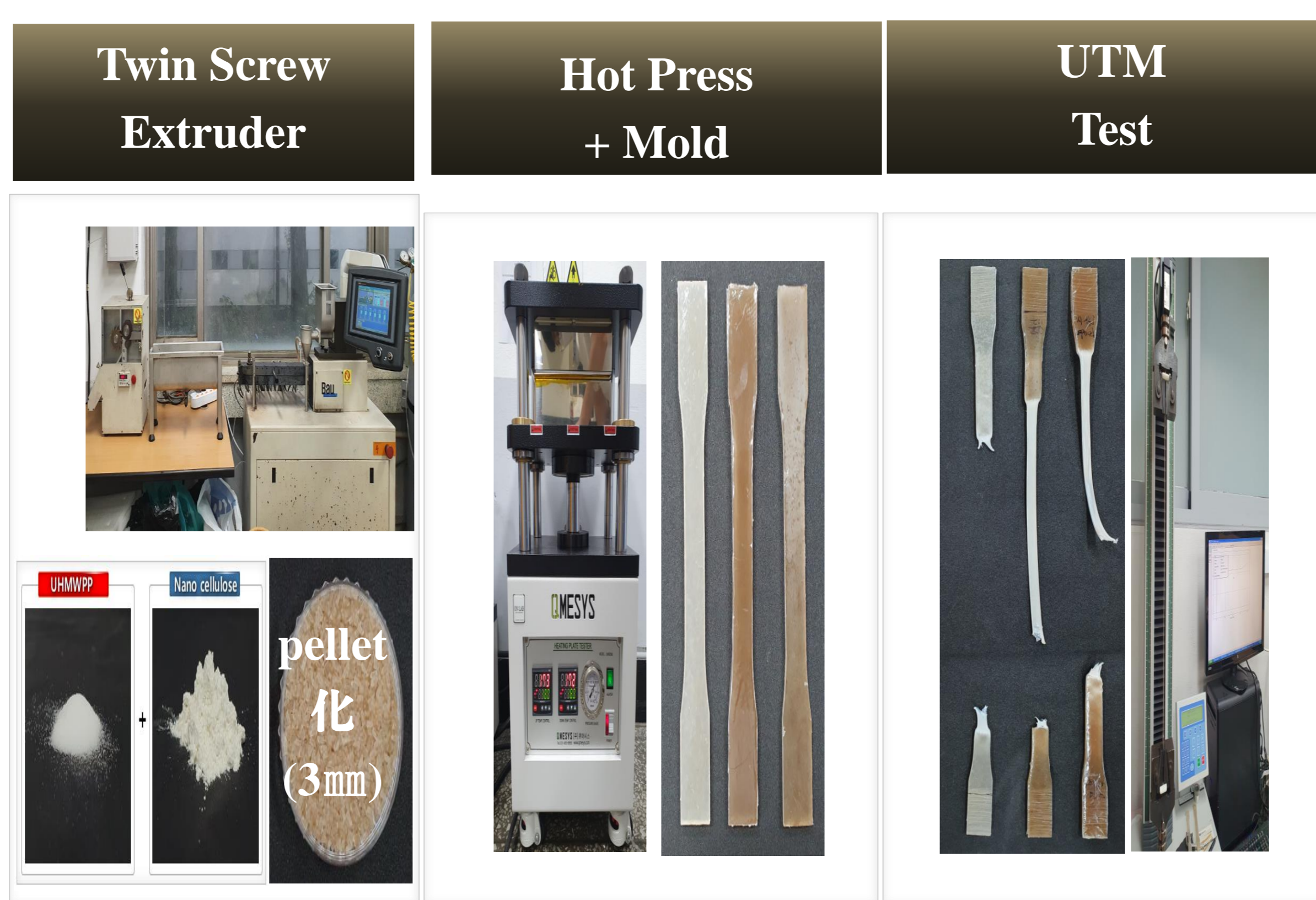
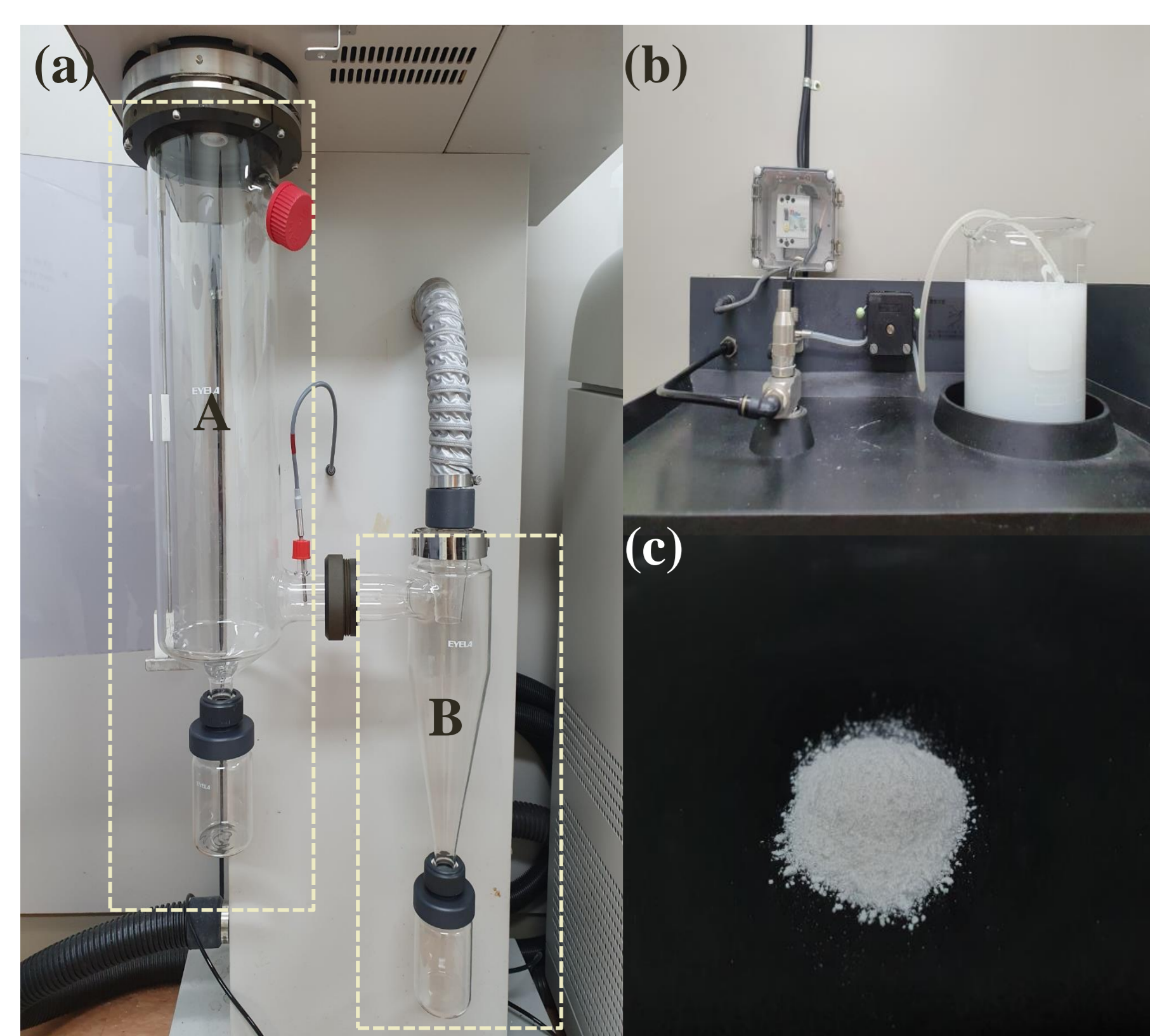
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Abstract

The surface-modified cellulose powder was successfully manufactured. Cellulose is highly hydrophilic and has a strong property of clumping together. To solve this problem, it is essential to disperse the surface in the solvent and fibrillize it. It is difficult to make the modified cellulose in a solvent into a powder form when drying in an oven or freeze. In this study, cellulose was spray-dried and successfully manufactured in powder form. The microstructure according to the drying type was analyzed using scanning electron microscope (SEM). Cellulose manufactured using the spray drying method is ultra-high molecular weight polypropylene (UHMWPP) It was compounded with and finally made into pellets.

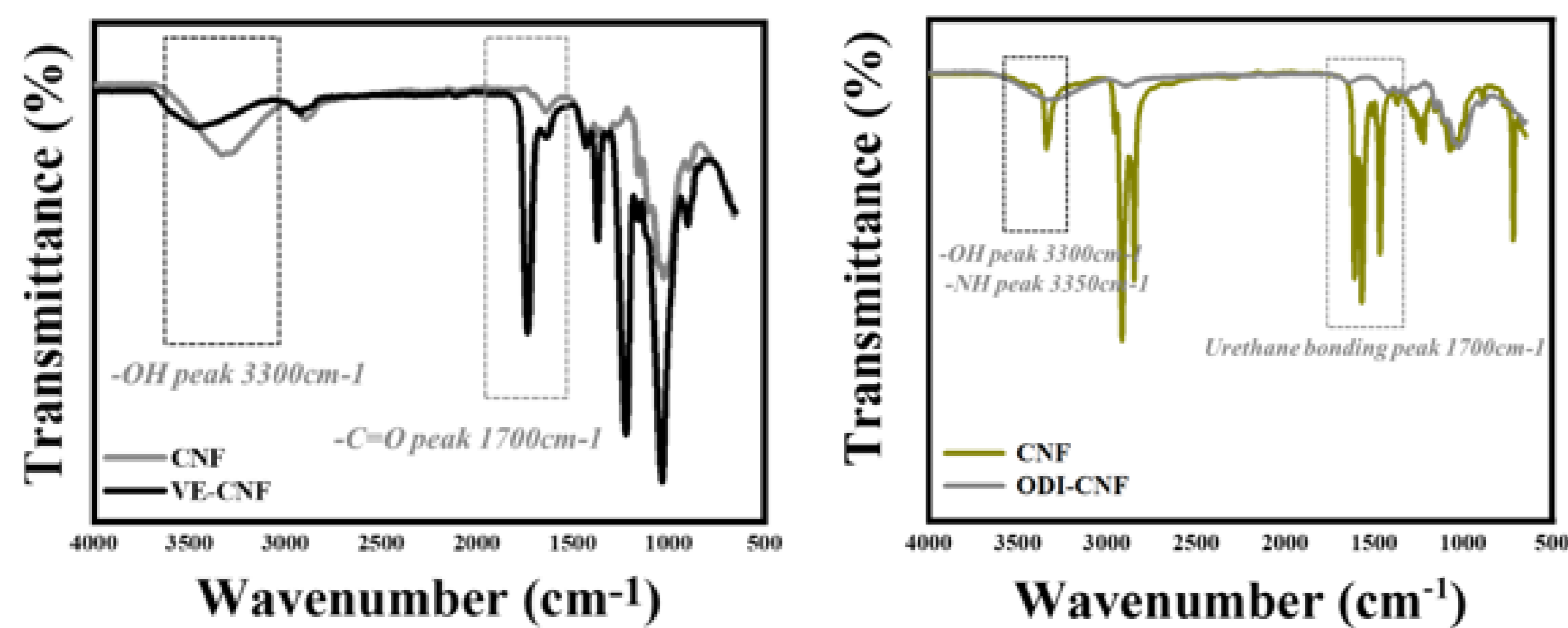
Experimental



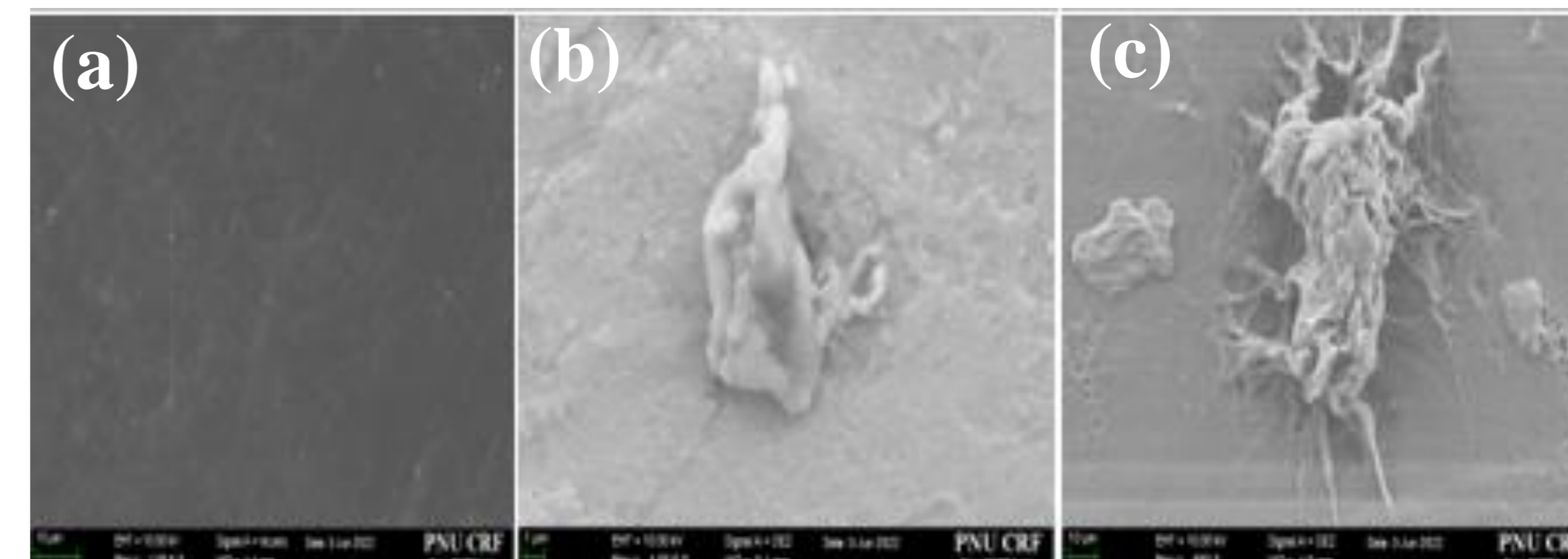
1. Surface modification of nanocellulose using modifiers followed by complexation with UHMWPP
2. Comparison of mechanical properties and spectroscopic properties of UHMWPP containing modified nanocellulose

Results

FT-IR

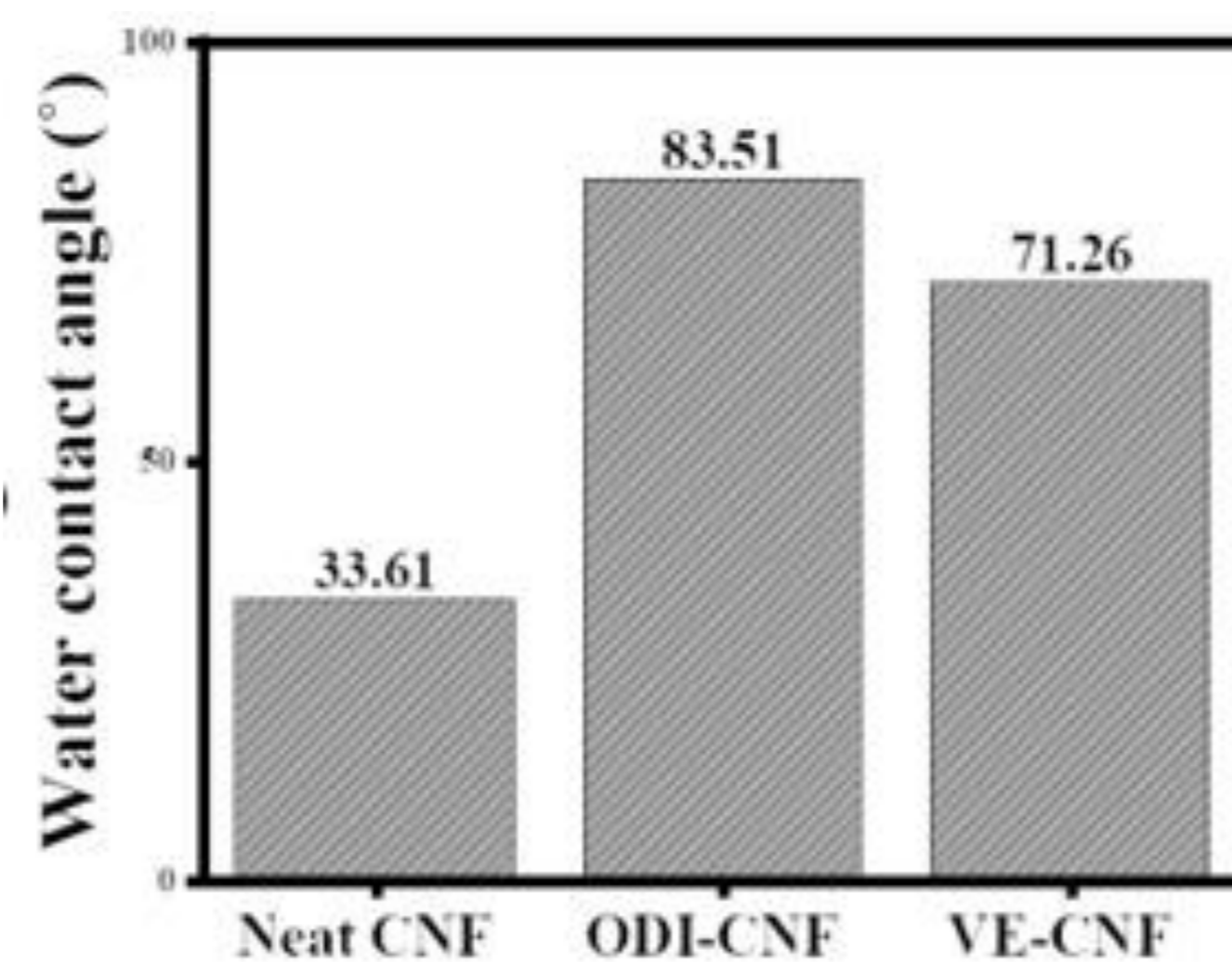
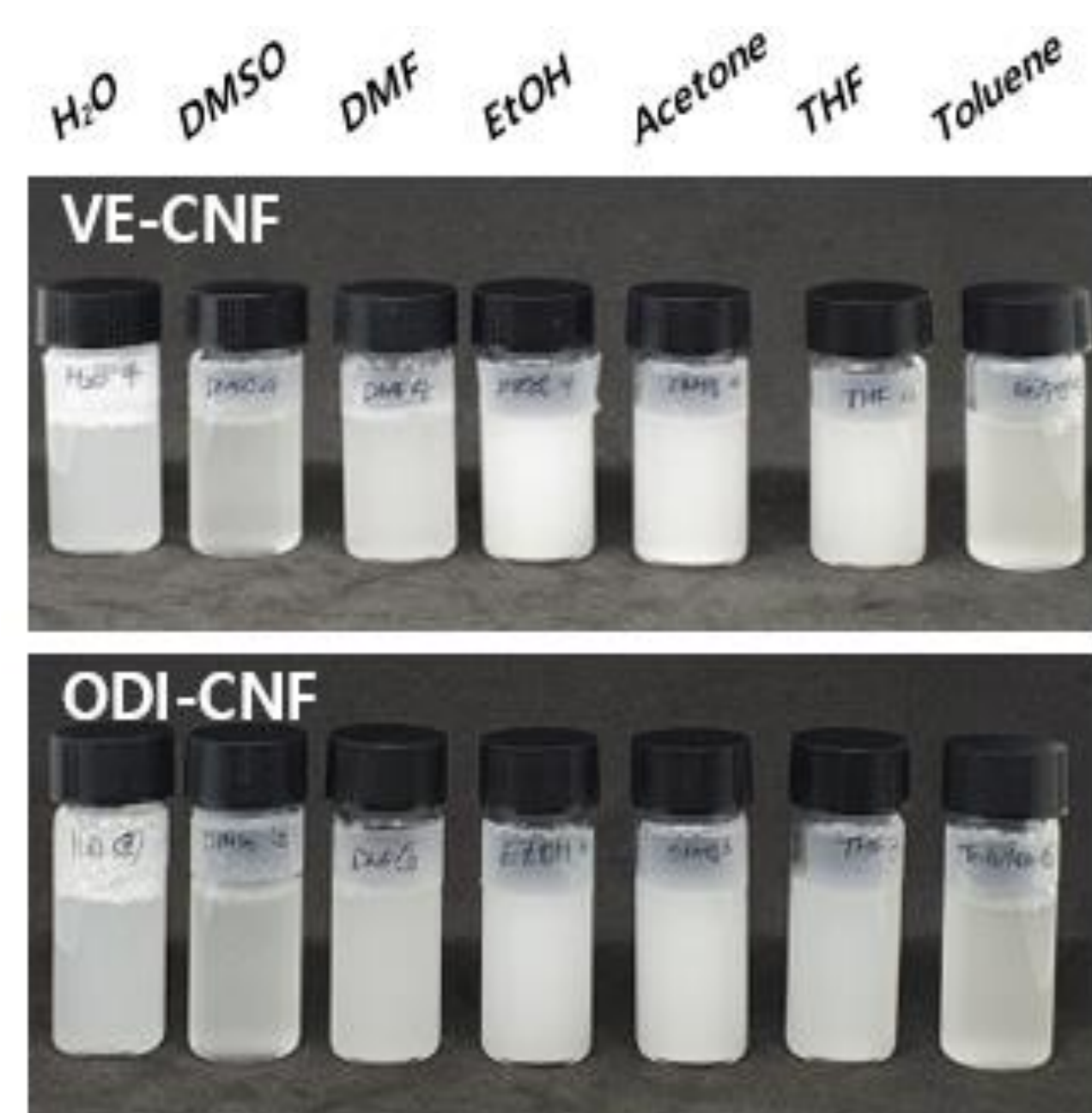


SEM

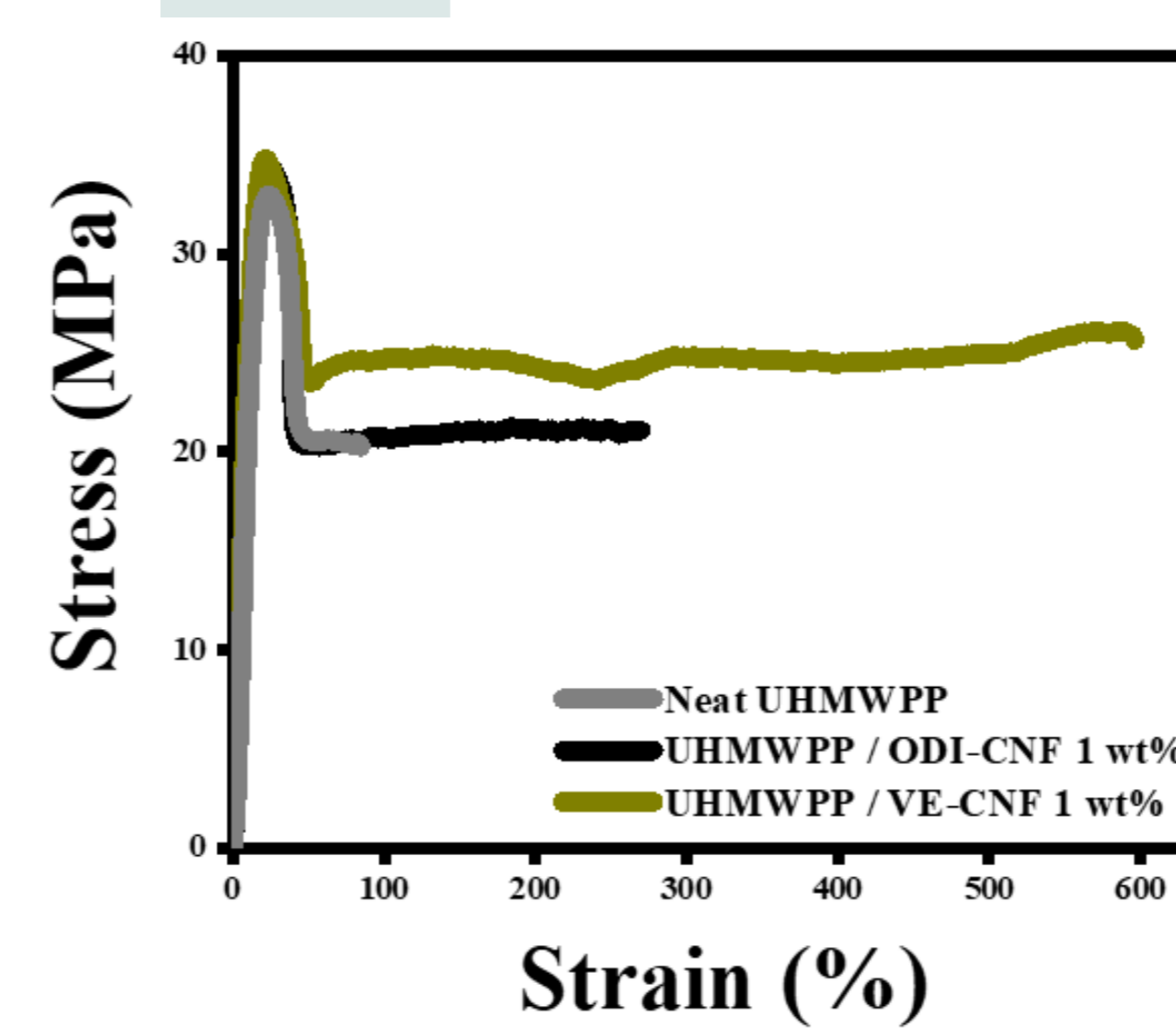


- To confirm the composite properties of UHMWPP and modified CNF, the surface of the specimen was observed with SEM, and the images are shown in (a) neat UHMWPP, (b) UHMWPP/VE-CNF 1wt%, and (c) UHMWPP/ODI-CNF 1wt%

Solvent dispersion & Water CA



UTM



	Stress (Mpa)	Strain (%)
Neat UHMWPP	32.97	94.2
UHMWPP/VE-CNF 1 wt%	34.80	569.9
UHMWPP/ODI-CNF 1 wt%	34.29	293.74

- Successfully synthesized through spectroscopic and mechanical properties analysis.
- The prepared composite was homogeneously mixed at 1% content to improve mechanical properties compared to pure UHMWPP

Acknowledgement

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