

Role of carbon nanomaterials in improving the geopolymers strength

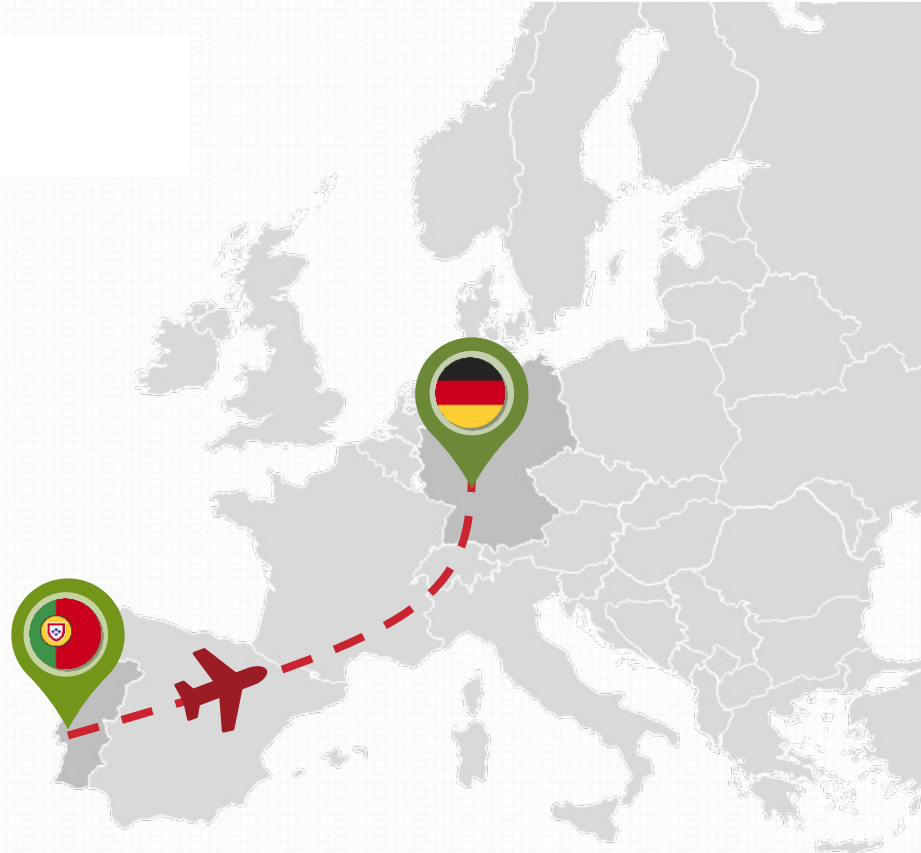
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ABOUT ME

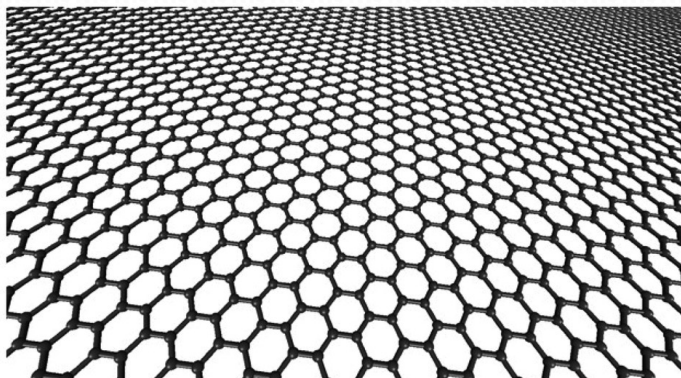


M.Sc. Liliya Dubyey

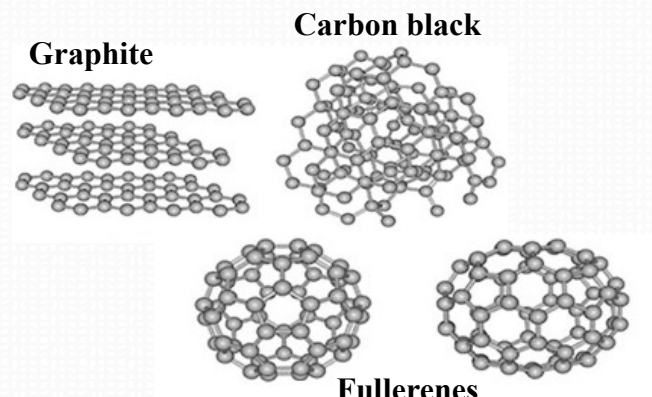
- B.Eng. Micro and Nanotechnology
- M.Sc. Advanced Materials and Innovative Recycling
- Research assistant at Institute of Construction and building materials



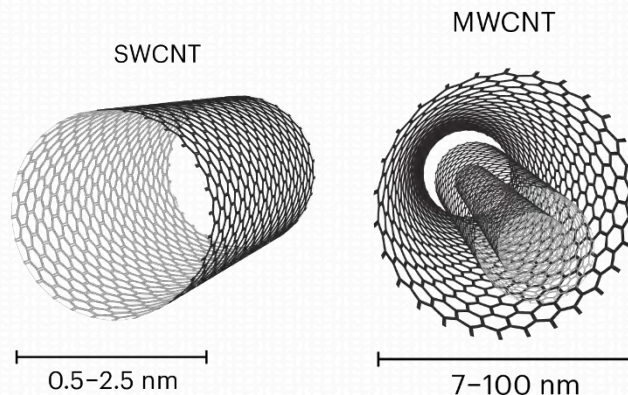
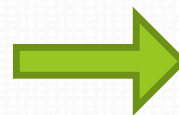
CARBON NANOMATERIALS



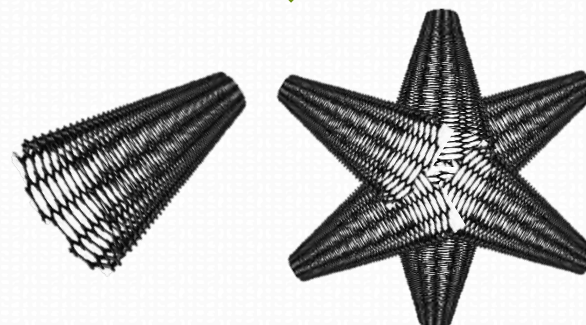
GRAPHENE



+500 CARBON ALLOTROPES



CARBON NANOTUBES

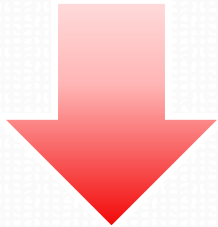


CARBON NANOHORNS

CARBON NANOMATERIALS

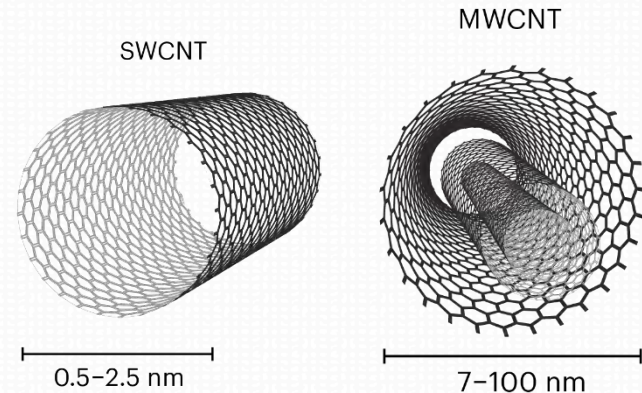


- Thermal conductive
- Electrical conductive
- High tensile strength
- High surface area

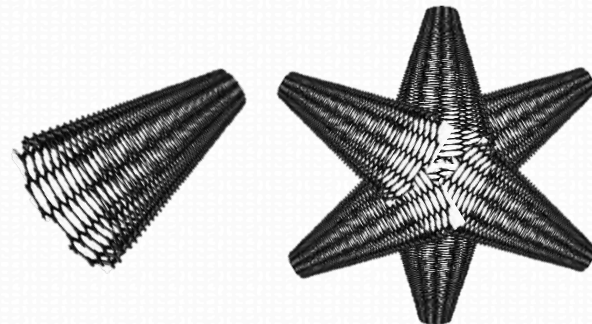


- ...
- Hard to disperse

1. How to disperse them?
2. Which is more efficient?

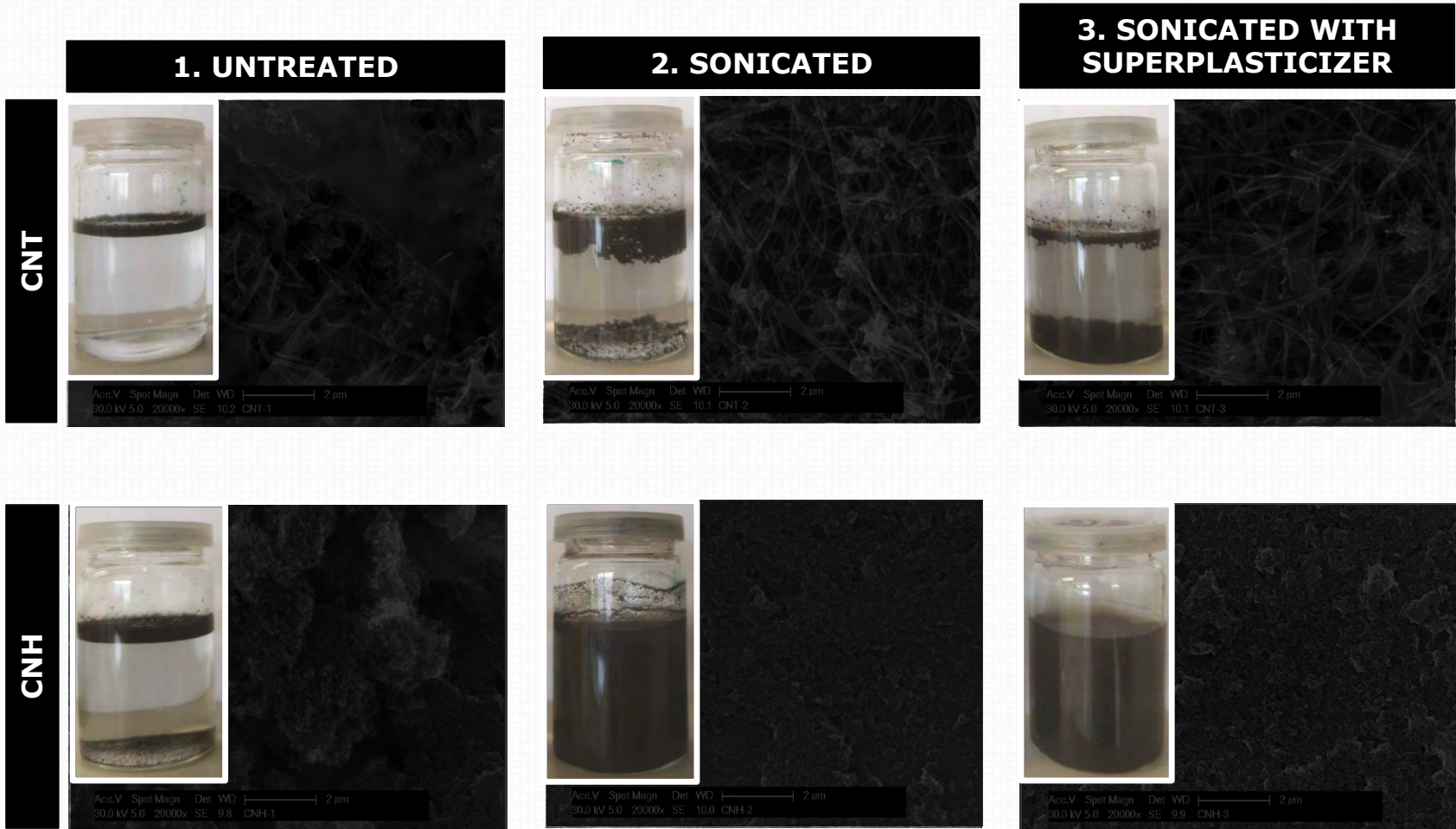


CARBON NANOTUBES



CARBON NANOHORNS

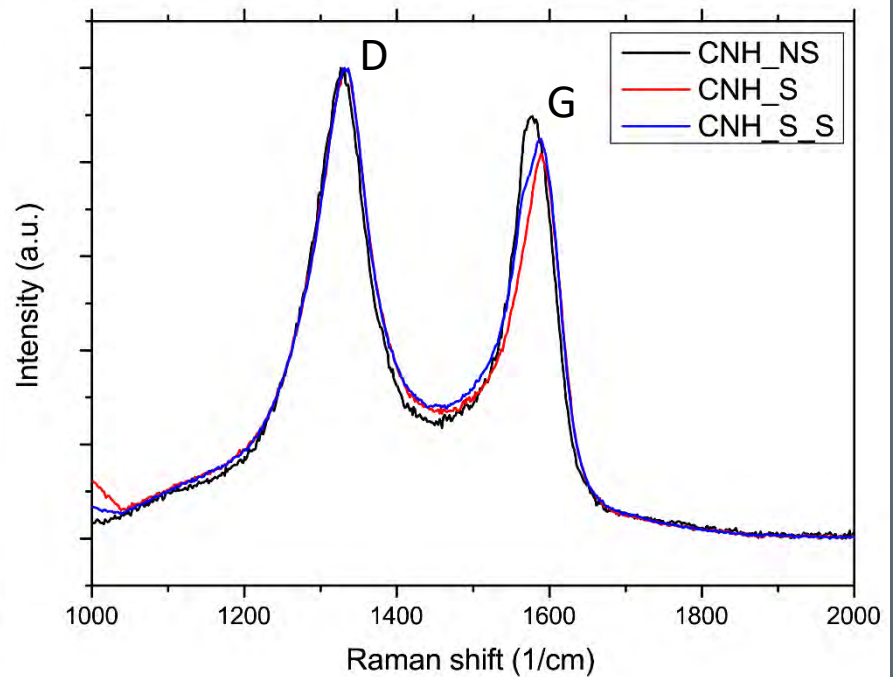
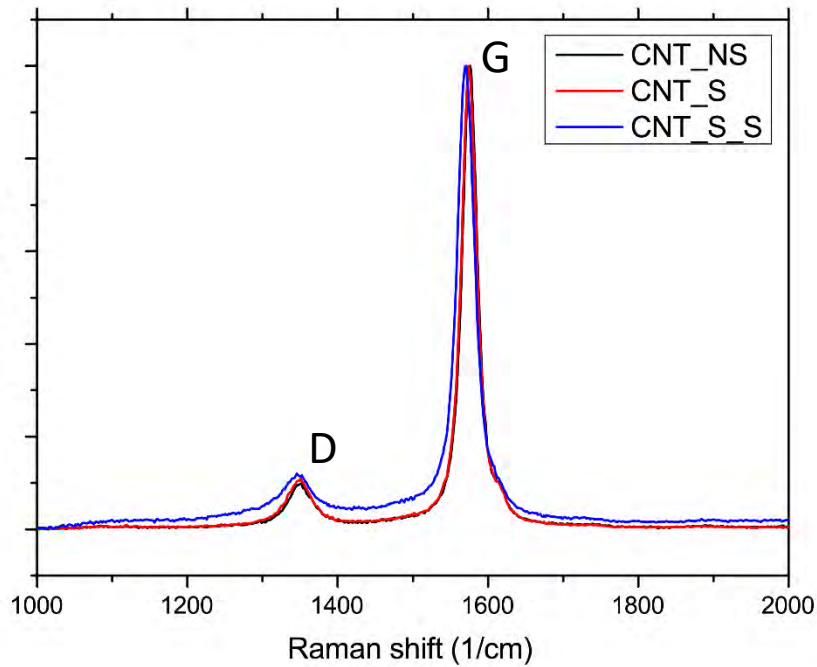
MORPHOLOGY OF THE CNT/CNH SUSPENSIONS



STRUCTURAL CHANGES OF THE SUSPENSIONS

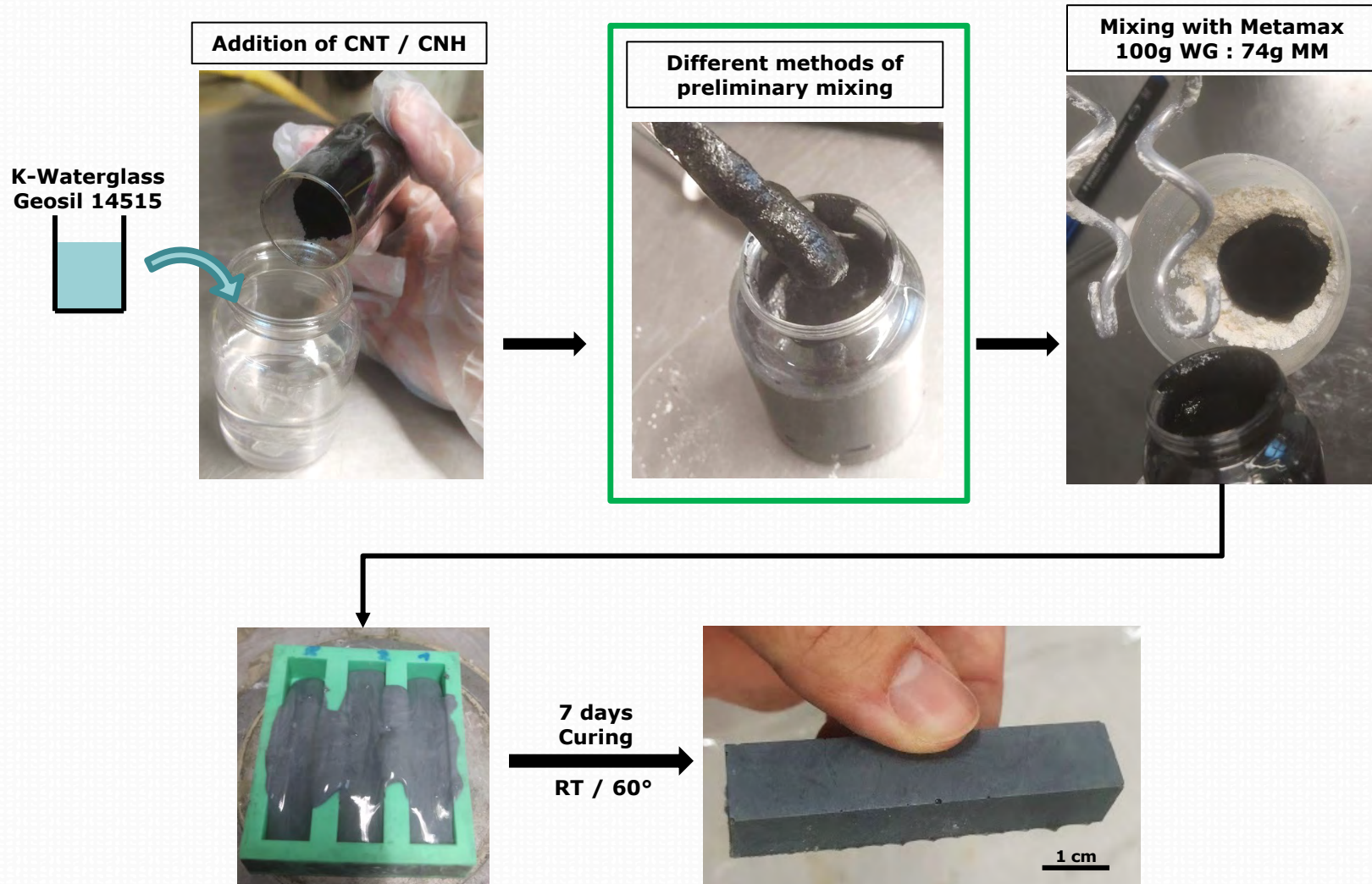
CNT

CNH

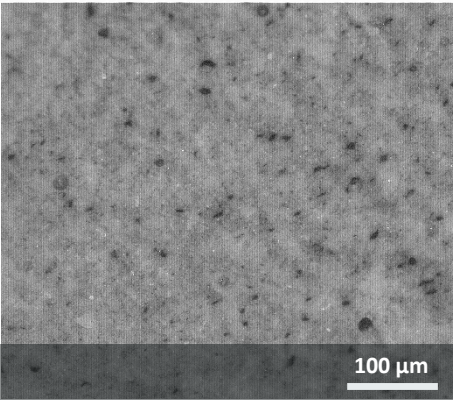
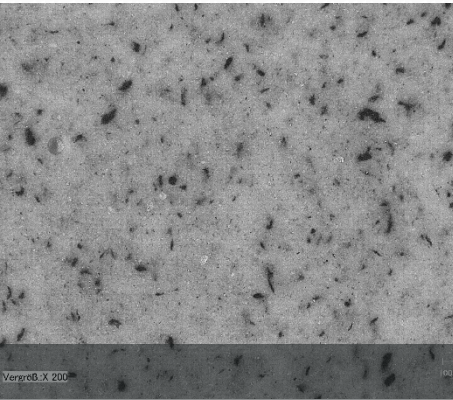
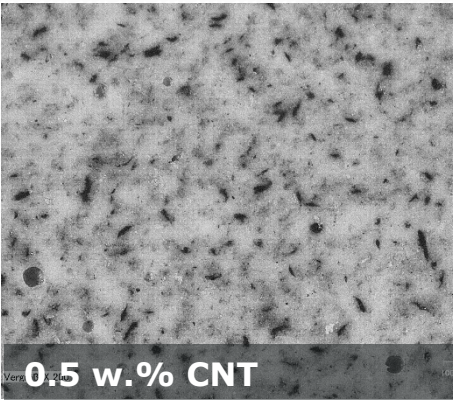
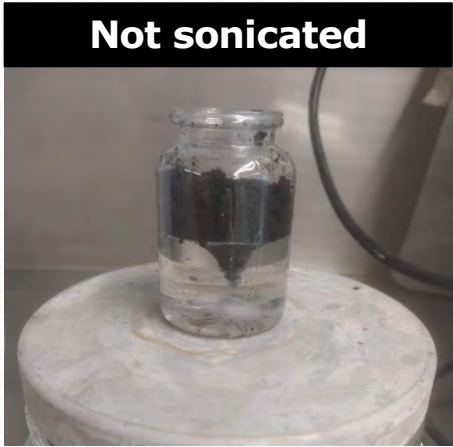


Id/Ig	NOT SONICATED	SONICATED	SONICATED AND SUPERPLASTICIZER
CNT	0,10	0,11	0,12
CNH	1,11	1,22	1,18

EXPERIMENTAL PROCEDURE

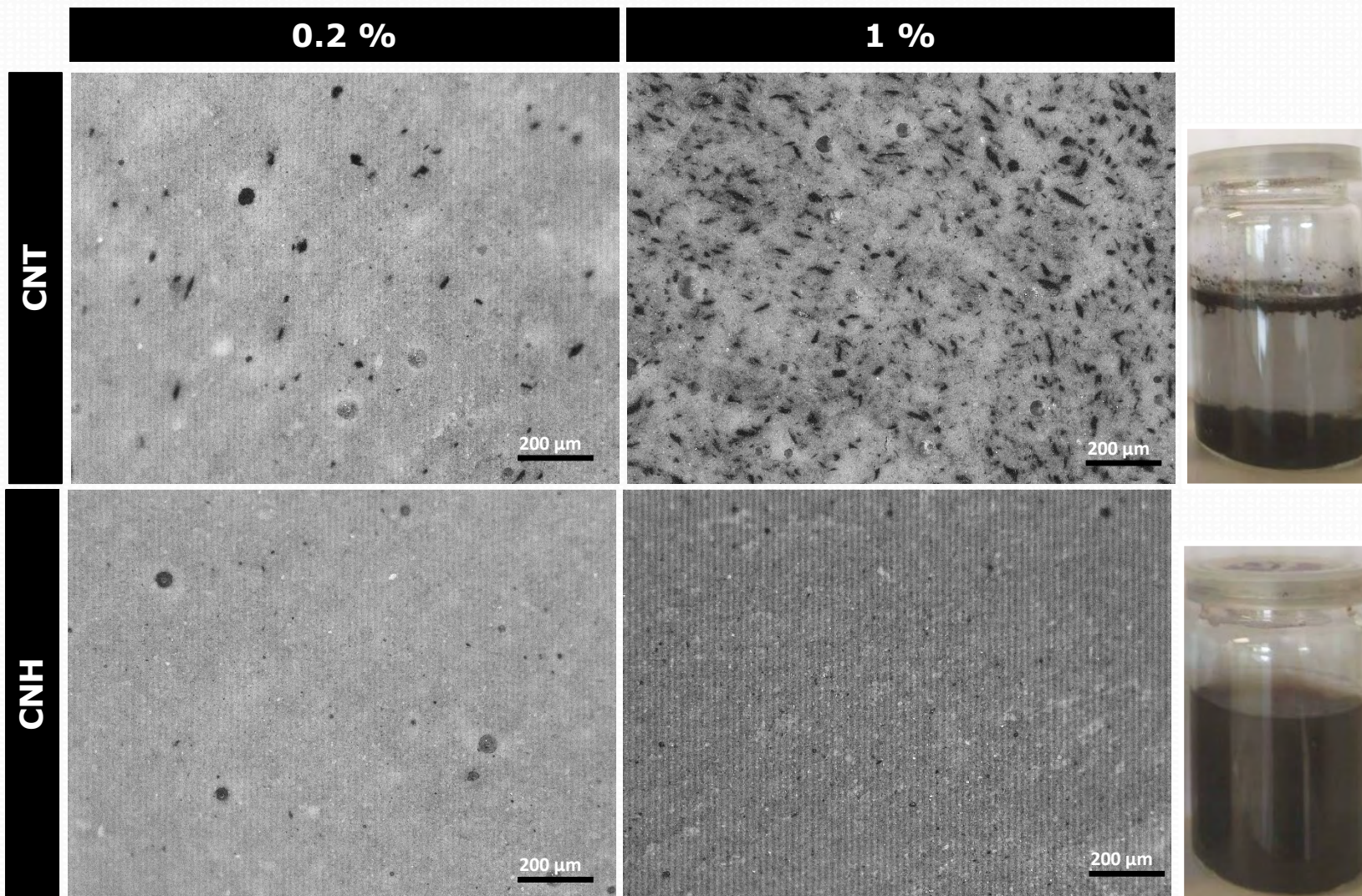


METHODS OF DISPERSION IN GEOPOLYMER

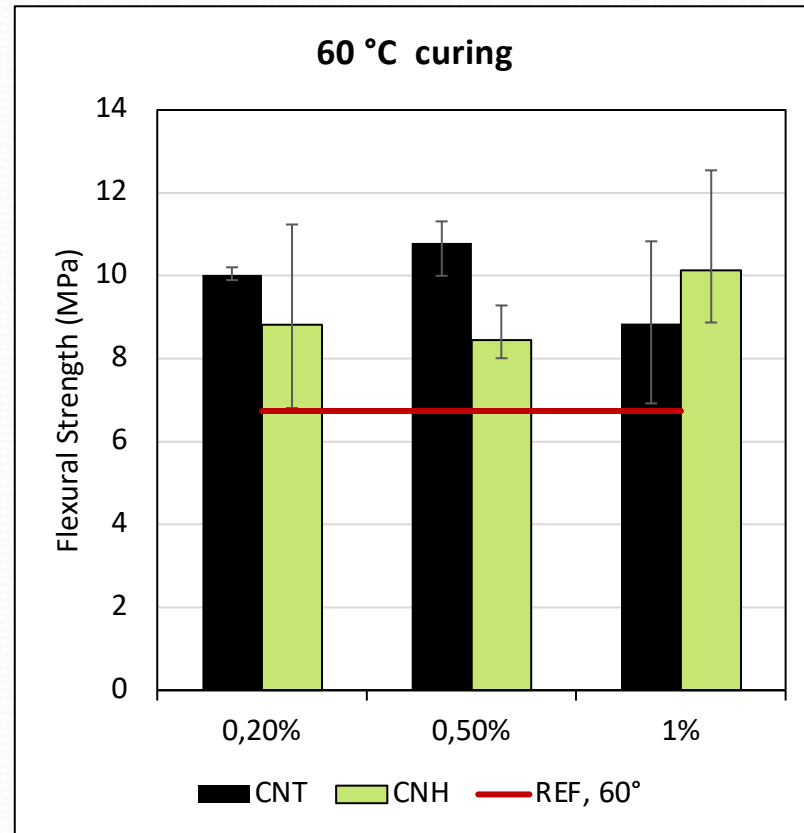
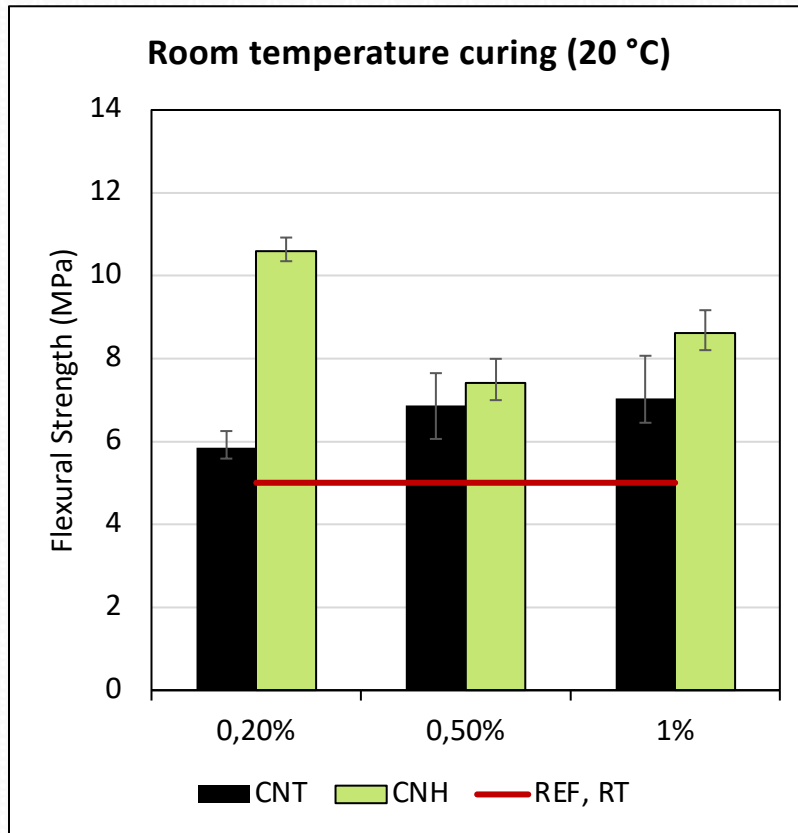


Best dispersion

PROBE SONICATION DISPERSION OF CNT VS CNH



FLEXURAL STRENGTH AT 7 DAYS



- Oven curing increased the strength of all mixes
- All geopolymers with carbon nanomaterials have higher strength
- CNH in general show a higher strength than CNT
- Oven curing influenced CNT-GP more than CNH-GP

CONCLUSION

1. How to disperse CNT/CNH in geopolymer?

- The use of superplasticizer is not needed
- Probe sonication is the best dispersion method

2. Which carbon nanomaterial is more efficient?

- Both CNH and CNT enhance the strength of geopolymers
- CNH are easier to disperse -> higher strength

THANK YOU!