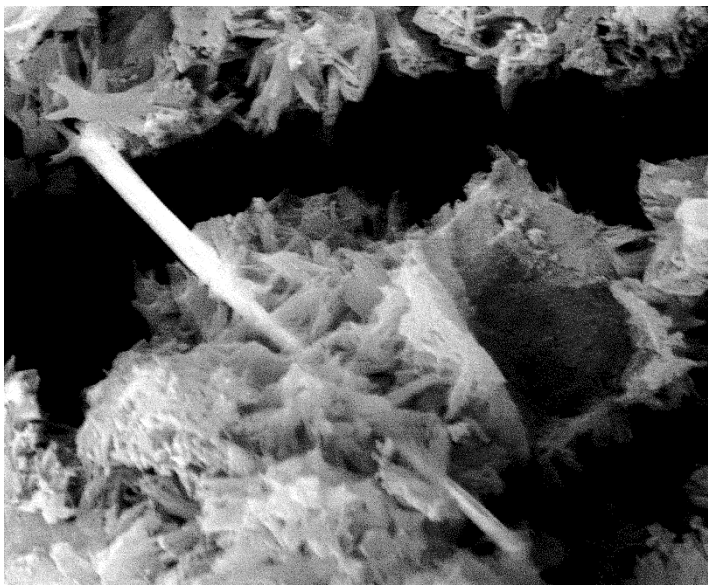


Stronger Cement

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Nanotubes (NT) are considered as promising nano-reinforcement fillers in cement-based materials. The main challenge towards achieving a significant enhancement in cement properties is an effective dispersion of the agglomerated NT. In the talk I will demonstrate how efficient NT (carbon or WS₂) dispersion in cement results in substantial flexural and compressive strength enhancements at NT concentration below 0.15 wt%. The reinforcement by WS₂ NTs (see figure) remains significant after a variety of curing processes, suggesting a genuine nanoscale reinforcing effect. Finally, by employing a comprehensive fractography we show that the WS₂ NTs inhibit crack propagation by bridging with a pullout failure mechanism.



SEM image of WS₂ NT-based cement composite showing a WS₂NT covered by a layer of Calcium-Silicate-Hydrate (C-S-H) phase.

References

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