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## Production of hydrophobic nano-solutions for concrete water repellent

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In this work, different hydrophobic nano-material solutions were prepared based on  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{ZnO}$ , calcium citrate, stearic acid and sodium stearate. The absorption percentage of water onto the Portland cement concrete surface coated with each solution were measured after seven days of complete immersion. They were found to be 0.95%, 1.52%, 2.67%, 3.56%, 3.6, 3.7%, 3.97% and 4.75% for sodium stearate-isopropanol-gel-52, stearic acid-isopropanol,  $\text{SiO}_2$ - $\text{H}_2\text{O}$ -ethanol-calcium stearate,  $\text{TiO}_2$ - $\text{H}_2\text{O}$ -70, glass water, calcium citrate wires- $\text{H}_2\text{O}$ ,  $\text{ZnO}$ - $\text{H}_2\text{O}$  and control (without coating), respectively. Scanning electron microscopy (SEM) and FTIR were done for the surface of the concrete sample coated with sodium stearate solution in the gel form that showed the lowest absorption percentage. The compression strength tests for all samples did not show any effect neither positively or negatively.

### Recent Publications:

1. H Abdualla, H Ceylan, S Kim, K Goplakrishnan, P C Taylor and Y Turkan (2016) System requirements for electrically conductive concrete heated pavements. *Transport. Res. Rec.* 2569: 70-79. DOI: 10.3141/2569-08.
2. J Gomis, O Galao, V Gomis, E Zornoza and P Garces (2015) Self-heating and deicing conductive cement. *Experimental study and modeling. Constr. Build. Mater.* 75: 442-449.
3. Arabzadeh, H Ceylan, S Kim, K Gopalakrishnan and A Sassani (2016) Fabrication of polytetrafluoroethylene-coated asphalt concrete biomimetic surfaces: a nanomaterials-based pavement winter maintenance approach. in *Proceeding of ASCE ICTD*. 54-64. ISBN: 9780784479926.

### Biography

Awni Al Ootom has over 20 years of combined industrial experience, research and serving in international organization towards a world free of chemical weapons. He has extensive outstanding research in Energy (renewable energy and unconventional energy sources).

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