

## **Number (16) In The List of Total Publications**

**S. Abd.ElAleem**<sup>a</sup>, Mohamed Heikal<sup>b,c</sup>, W.M. Morsi<sup>d</sup>, "Hydration characteristic, thermal expansion and microstructure of cement containing nano-silica", *Construction and Building Materials*, 59 (2014) 151–160.

<sup>a</sup>**Chemistry Department, Faculty of Science, Fayoum University, Fayoum, Egypt.**

<sup>b</sup>Chemistry Department, College of Science, Al Imam Mohammad Ibn Saud, Islamic University (IMSIU), Riyadh, Saudi Arabia.

<sup>c</sup>Chemistry Department, Faculty of Science, Benha University, Benha, Egypt.

<sup>d</sup>Building Physics Institute BPI, Housing and Building National Research Center, HBRC, Dokki, Giza 11511, Egypt.

### **Abstract**

The effect of nano-silica (NS) on the hydration characteristics, thermal expansion and microstructure of cement pastes and mortars was studied. OPC was replaced with NS up to 6.0%. The presence of NS increases the required water of standard consistency and elongated the setting times. The results of chemically combined water, free Portlandite, pH, bulk density, compressive strength and thermal expansion showed that, NS contents up to 5.0 mass% improve the physico-chemical and mechanical properties of cements. NS behaves not only as filler to improve the microstructure, but also as an activator to promote the pozzolanic reaction, which enhances the formation of hydrated products. It was concluded that, partially substitution of OPC up to 5 mass% NS improves the mechanical and microstructural characteristics in comparison with the neat OPC paste up to 90 days.