

December 10-12, 2018  
Rome, ItalySaud Al- Otaibi, Nano Res Appl 2018, Volume 4  
DOI: 10.21767/2471-9838-C7-027

# Potential for using Natural Pozzolana for Concrete in Kuwait

**Saud Al- Otaibi**

Kuwait Institute for Scientific Research, Kuwait

The meaning of the word 'sustainability' is arbitrary and depends on many factors like availability of raw materials, construction safety, functionality, and energy. Concrete is the second largest manufactured product in volume on earth after processed water. Thus, any positive action toward the reduction of specific CO<sub>2</sub> emission would significantly contribute globally to the reduction of overall greenhouse gas emissions. In an era of climate change and potentially depleting natural resources, countries need to introduce more sustainable construction. The use of pozzolanic materials as a replacement for cement in construction field has become an unavoidable practice nowadays because of its economic and environmental advantages and durability. Especially in countries like Kuwait, belonging to Gulf region, where there are severe climatic conditions along with chemical exposure due to the coastal area effects, use of pozzolanic materials has more relevance. This paper presents results of a study carried out on using a natural pozzolanic material obtained from Super Burkani Quarry in Saudi Arabia. This material is a natural volcanic ash processed and pulverized in different particle sizes. The research work included paste, and mortar mixes with different levels of OPC replacement. The experimental program covered microstructure, rheology, hydration process, and hardened mechanical and durability properties. The results were promising as to improvement of properties in most aspects.

## Recent Publications

1. Suad Al-Bahar, Saud Al-Otaibi, Sharifa Al-Fadala, Ali Abduljaleel, Mahmoud Fawzy Taha, Fatma Al-Fahad, Amer Al-Arbeid, Tarun K. Mkherjee, (May 17 2016) "Process Using Multiple Waste Streams to Manufacture Synthetic Lightweight Aggregate", US 9340456 B2.

2. Al-Otaibi,S.; Al-Bahar, S.; Al-Fadala, S.; Al-Fahad, F.; Abduljaleel, A.; Taha,M, (2018), "Recycling Sand Wash Fines as Synthetic Lightweight Aggregates", *Proceedings of the Institution of Civil Engineers - Construction Materials* V. 171,
3. S. Al-Bahar, J. Chakkamalayath, A. Joseph, S. Al-Otaibi, M. Abdulsalam, and A. Al-Aibani. (2017), "Effect of Volcanic Ash on the Mechanical Properties and Surface Morphology of Hydrated Cement Paste". *ASCE Journal of Materials in Civil Engineering*, Volume 29 Issue 8 - August 2017
4. S. Al-Bahar, J. Chakkamalayath, A. Joseph, S. Al-Otaibi and M. Abdulsalam, (April 2018), "Nanomechanical and Surface Morphological Properties of Hydrated Cement Paste Containing Volcanic Ash and Micro- or Nano- Silica", *Korean Journal of Civil Engineering*. April 2018, Volume 22, Issue 4, pp 1354–1360.
5. Al-Bahar S., Al-Otaibi S., Taha M., Al-Arbeed, S. Abduljaleel A., Al-Fahad F. and Al-Fadala S., (2013) "Heating Electron Microscope for Evaluation of Melting Behavior of Lightweight Aggregates Mixtures", *International Journal of Civil Engineering and Building Materials*, V. 3, No. 2, pp. 49-66.

## Biography

Dr. Saud Fahhad Al-Otaibi hold Ph.D. Civil and Structural Engineering from University of Sheffiled , UK since 2002. He is working as a research scientist in Kuwait Institute for Scientific Research. He is currently the president of the ACI Kuwait Chapter. His field of interest and expertise is in construction materials in general with some focus on cement and concrete, also worked on building systems and construction management.

uotaibi@kisir.edu.kw