

REACTIVE METAL/GRAPHENE OXIDE DOPING TO FABRICATE POROUS GEOPOLYMERS FOR ARSENIC REMOVAL

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This study aims to understand the pore formation in Na-geopolymers towards environmental applications. One of the most important challenges is arsenic metal ion in underground water as well as industrial wastewater treatment. Aluminum, silicon and iron metal powders were added into geopolymer during the shear mixing, then matured at 30°C, 50°C and 70°C. The possible reactions for each metal powder was evaluated and proposed. Synergic effect of graphene oxide addition with reactive metal was also considered from 1wt% to 3wt% of GO to understand deeply the combined effect of additives. The arsenic removal tests was performed in model solution of 500 ppb, prepared by NaAsO₂ (AsIII). SEM images, XRD patterns, XRF elemental analysis, EDX mapping and BET surface and pore characteristics of doped GP powders before and after As treatment was recorded and discussed. It was found that As can be removed from the effluent between 6 h and 12 h at a solution: dosage ratio of 12. XRF removal line shows a good linearity and range to measure the As removal to be the lowest for 1wt%Si + 3wt% GO addition into Na-GP samples from 500 ppb to as low as 16 ppb which is very promising for Pakistan Environmental Regulations to be lower than 50ppb.

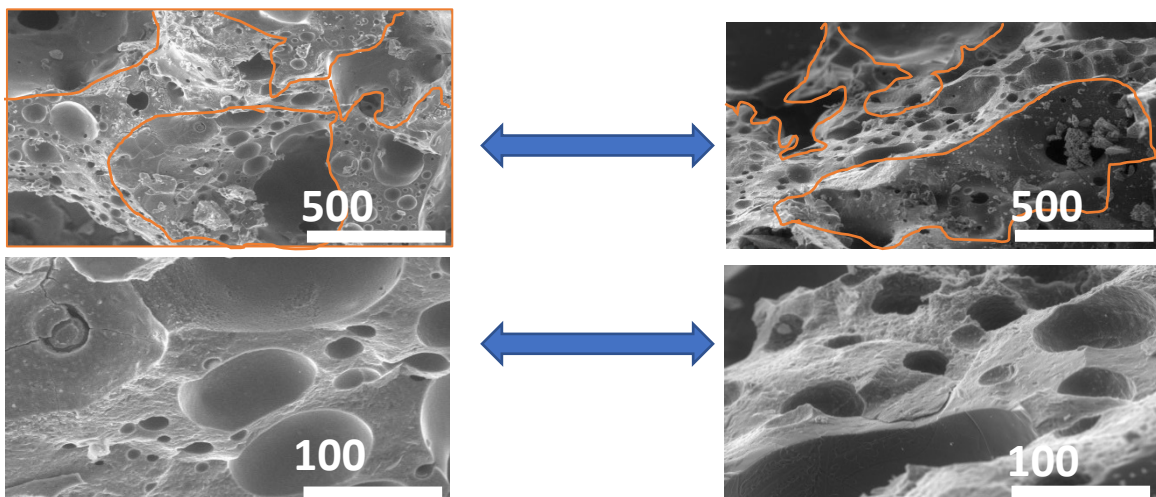


Fig.1. SEM images and schematic illustration of pores by area