**Preparation and Properties of Environmentally Conscious Concrete Using Geopolymer Method**

Motoki UEHARA

Environmentally conscious mortar and concrete (unit weight in dry condition =1.75t/$m^3$) was prepared using geopolymer method from fly ash, alkali silicate solution, and artificial lightweight aggregate (ALA). These compressive strength establishes a linear relation with alkali/$H_2O$ (mole ratio) of alkali silicate solution. Geopolymer materials are affected by low strength of ALA in terms of mechanical properties as well as the hardening materials of ordinary cement, whereas geopolymer lightweight mortar and concrete are excellent for chemical durability such as alkali-aggregate reaction resistance or the acid resistance. Potassium increases the fluidity of the fresh geopolymer mortar and concrete, and its high fluidity enables creation of hardened paste with higher strength under high alkaline concentrations.