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## Study of carbonation mechanism and post-carbonation permeability in a cement with high content of blast furnace slag

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Considering the reduction of the environmental impacts, the use of mixed cement is becoming important. Cement using highly replace ground granulated blast furnace slag fine powder has various characteristics, such as resistance for penetration of chloride ion, ASR e.t.c. On the other hand, resistance to carbonation is known to decrease than ordinary Portland cement. In this study, the carbonation behavior and its mechanism using highly replacement of blast furnace slag cement was discussed. In addition, the characteristics of penetration for water and gas after carbonation were investigated. As a result, it was found that carbonation of C-S-H excels predominantly in highly replacement of blast furnace cement and many vaterite is produced than calcite. Furthermore, it was revealed that after the carbonation with the collapse of C-S-H, the pore structure became coarse and the penetration resistance remarkably decreased. In particular, it was confirmed that the permeability of gas and moisture remarkably increased. Meanwhile, chloride ion permeation can be suppressed by taking advantage of the characteristics of the blast furnace slag fine powder. It is probably due to the influence of electrical adsorption performance.



Results of CaCO3 products on different concentration of carbon dioxide comparing OPC and BB