

Gary Kao

*B. Mat. E, M. Sci, UNSW
Research Engineer*

15 Mountain View Cres
West Pennant Hills NSW 2125
Email: gkao28@yahoo.com.au

Mobile: 0417 667 017
Phone: 0416 242 576
Fax: 02 9398 3114

27th February 2003

Jingslink Marketing Private Limited
10 Ubi Crescent #02-45
Ubi Techpark
Singapore 408564

Attention: Mr Chan Ah Lam

Subject: SEM (Scanning Electron Microscopy) on Xypex modified concrete and Penetron modified concrete

Dear Sir,

In regards to your enquiry on the differences between Xypex Admix and Penetron, I hope the following scientific examinations can answer your request. SEM (Scanning electron microscopy) technique was performed on the two supplied samples (concretes modified with Penetron) and Xypex Admix modified samples from the research programme currently being undertaken at Australian Centre Construction Innovation, University of New South Wales, Sydney, Australia.

Sample preparation for microstructure examination were identical where samples were prepared from the fractured surface of cracked and re-assembled concrete discs after immersion in tap water for more than 60 days.

At end of the 60 days immersion, a significant presence of fine crystals was observed on the concrete crack surface by SEM examination of samples containing Xypex Admix, Fig 1 & 2. These crystals are very different to those commonly found in concrete, such as ettringite, calcium hydroxide, gypsum, etc. It appeared that these characteristic crystals were being developed due to the crystallisation reactions in Xypex Admix modified concrete. It is also shown in Fig 2 that these crystals had nearly covered the cracks in the background concrete sample. This appears to demonstrate the crystallisation mechanism by which the Xypex Admix modified concrete seals fine cracks and improves the microstructure.

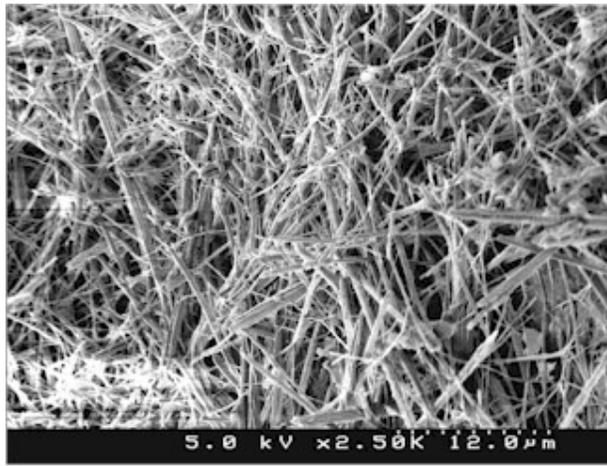


Fig 1. Microstructure on Sample of Xypex Admix Modified Concrete; Magnification x 2500

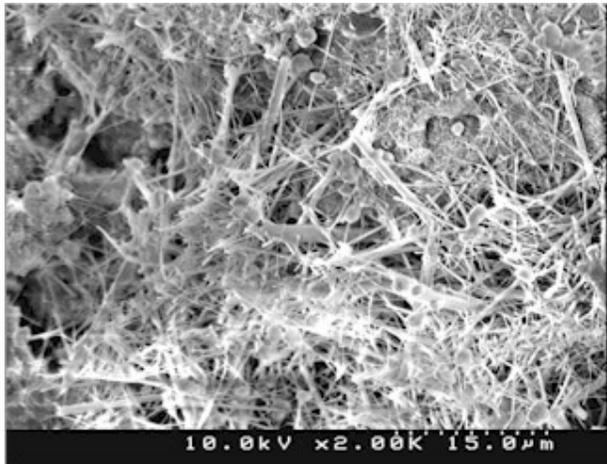


Fig 2. Microstructure on Sample of Xypex Admix Modified Concrete; Magnification x 2000

In comparison, the Penetron modified sample is shown in Fig 3. SEM images on the crack surface did not show a similar form, shape or population of crystals as reported in the Xypex Admix treated samples, Fig 1 & 2. No significant features in the microstructure could be identified.

The results of SEM examination of the microstructures of Xypex Admix modified concrete samples provided evidence of characteristic crystals developed on crack surface whereas the Penetron modified samples have shown an absence of similar type of crystalline growth other than ettringite.

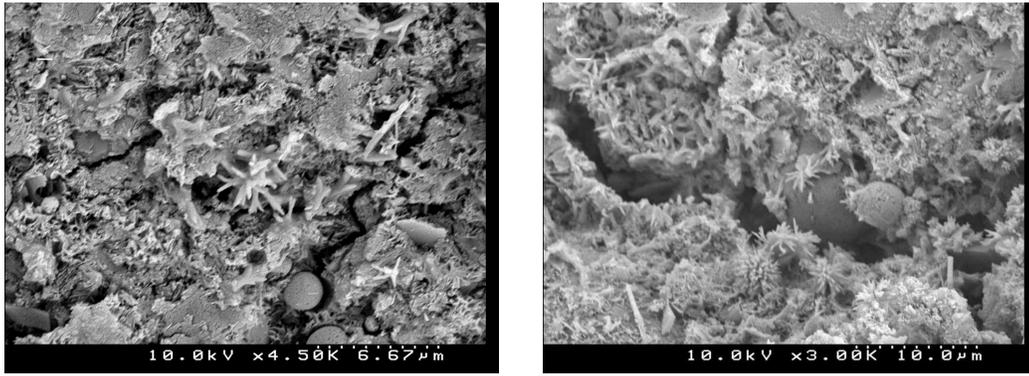


Fig 3. Microstructure on Sample of Penetron Modified Concrete; Magnification x 4500 (left) and x 3000 (right)

Xypex Admix is categorised as a “Chemically Reactive Pore Filler” in AS 1478.1, Chemical Admixtures for Concrete Mortar or Grout. Penetron product information indicates that its mechanism of reducing concrete permeability is similar to that of Xypex Admix. However, scientific examination on concrete samples modified using either admixture has shown significant differences in the microstructures between the two. Therefore Penetron and Xypex Admix should be considered as two different products based on this examination.

Yours Sincerely

Gary Kao
B. Mat. E, M. Sci, UNSW
Research Engineer