

An Aluminophosphate Molecular Sieve with 36 Crystallographically Distinct Tetrahedral Sites

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We report that a new medium-pore AlPO₄ molecular sieve denoted PST-6 (POSTECH number 6) has 36 crystallographically-distinct tetrahedral sites (T-sites) in the asymmetric unit. PST-6 was prepared by calcination of another new aluminophosphate (AlPO₄) material with an unknown structure synthesized using diethylamine as a structure-directing agent, which is thought to contain bridging hydroxyl groups. Its structure has been determined and refined by a combination of electron crystallography, X-ray powder diffraction, and computer simulation. Leaving aside SSZ-57 (*SFV), a modulated zeolite whose “idealized” unit cell possesses 99 symmetrically independent T-sites, PST-6 is crystallographically more complex than any zeolitic material known. It is also the first medium-pore material which contains a one-dimensional pore system consisting of parallel 10- and 8-ring channels. This shows that novel, highly complex zeolite structures that contain even-numbered rings only can arise at a simple AlPO₄ composition.