BELTER TECH®
Sustainable Building Solutions

INSTITUTE FOR SUSTAINABLE INFRASTRUCTURE
I S I

The most consistent and highest quality sources of Volcanic Ash throughout Western United States - Belter Tech Zeolite

Processed and shipped from Pahrump, Nevada. Our Zeolite is mined from low-profile surface scraping, put through state-of-the-art crushing & screening, and shipped directly to your local ready-mix plant. Our testing has shown replacements of clinker up to 30% with impressive results in a variety of mix designs; all meeting and exceeding ASTM C618.

You would be 'hard pressed' to find a more substantial Value Engineering Proposition when it comes to your concrete requirements….than Belter Tech's Zeolite Natural Pozzolans. Serving California, Nevada, and Arizona concrete plants; ready-mix and precast.

DURABLE CONSTRUCTION

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LIFETIME DURABILITY

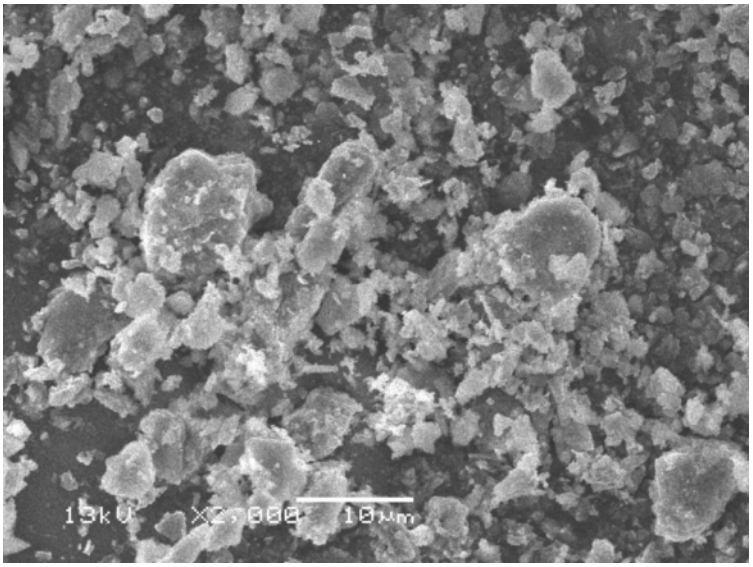
These values below were all tests results listed in ASTM C 618-23 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

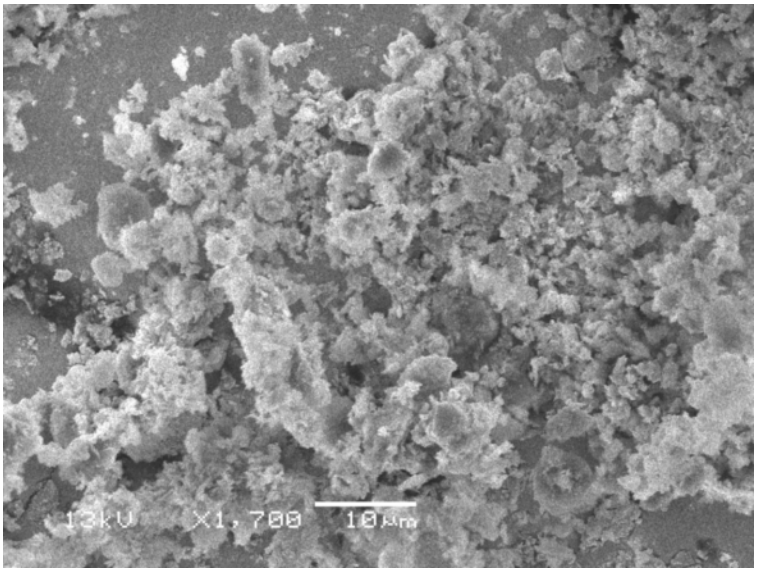
Chemical Composition	Requirements per ASTM C618, Class N	Clinoptilolite Zeolite, KMI Zeolite
SiO_2 (%)	-	69.11
Al_2O_3 (%)	-	11.82
Fe_2O_3 (%)	-	1.85
$SiO_2 + Al_2O_3 + Fe_2O_3$ (%)	70.0 min.	82.8
CaO (%)	-	1.97
MgO (%)	-	0.54
Na_2O (%)	-	3.12
K_2O (%)	-	3.71
Na_2O_{eq} (Na_2O+ 0.658K_2O) (%)	-	5.56

C-618 Specification	N	F	C
Sum SiO2, Al2O3, Fe2O3	≥ 70 %	≥ 70 %	≥ 50 %
SO3	≤ 4.0 %	≤ 5.0 %	≤ 5.0 %
Moisture	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %
Loss on Ignition (LOI)	≤ 10 %	≤ 6.0 %	≤ 6.0 %
325 Sieve (% Retained)	≤ 34 %	≤ 34 %	≤ 34 %
Water Requirement	≤ 115 %	≤ 105 %	≤ 105 %
Strength Activity Index at 7 & 28 Day for all types		(N,F,C)	≥ 75%

Physical	
Moisture	2.9 %
325 Sieve	78.6 % Passing
H2O requirement	107 %
Autoclave exp.	0.04 %
Density (g/cm3)	2.1
Loss of Ignition (LOI)	7.3 %
Strength Activity Index	
@ 7 days	81.1 %
@ 28 Days	104 %

*Strength tests were based off of a mix with 20% cement replacement with KMI Zeolite, relative to straight (only) cement control mix.





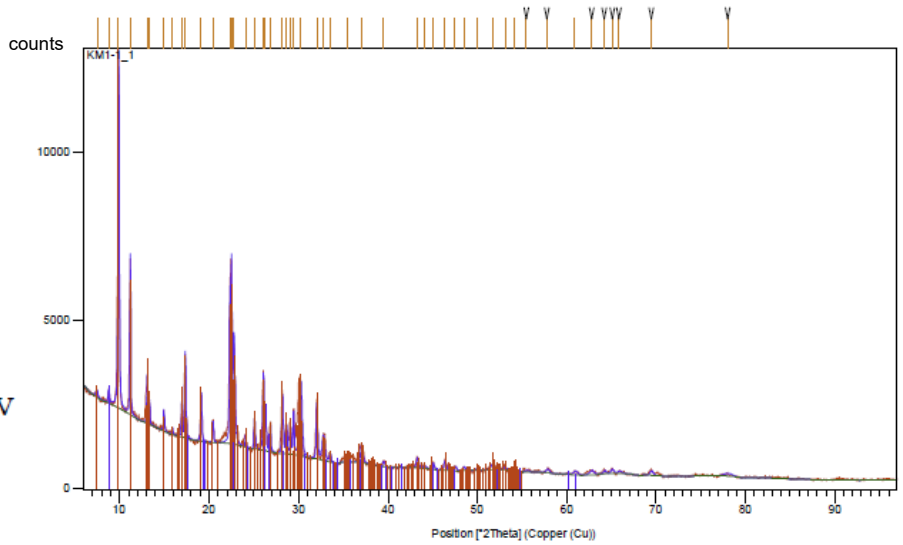
SEM pictures of 'spherical-crystalline' structured zeolite - above.

XRD will give the type and relative concentrations of the crystalline phases - below.

Main Graphics, Analyze View:

Measurement Conditions:

Sample Identification	KM1-1
Start Position [°2Th.]	6.0331
End Position [°2Th.]	96.9291
Step Size [°2Th.]	0.0260
Scan Step Time [s]	37.7500
Anode Material	Cu
K-Alpha1 [Å]	1.54060
K-Alpha2 [Å]	1.54443
K-Beta [Å]	1.39225
K-A2 / K-A1 Ratio	0.50000
Generator Settings	40 mA, 45 kV
Diffractometer Type	XPert MPD
Spinning	Yes



Pattern List:

Visible	Ref. Code	Compound Name	Displacement [°2Th.]	Scale Factor	Chemical Formula
*red	01-070-1859	Clinoptilolite-Ca	0.000	1.146	Ca3.16 Si36 O72 (H2 O)21.80
*blue	00-010-0495	Phlogopite-1\ITM\RG	0.000	0.039	K Mg3 (Si3 Al) O10 (O H)2

DISCUSSION:

The results indicate that Clinoptilolite is the major phase present with phlogopite as a very minor phase. Estimates of clinoptilolite would be in the range of 95++ %, with the phlogopite phase <<5% (error is ~5%). All peaks were identified.