CLAIMS

1. A zeolitic binder-converted composition comprising:
   a. a zeolite X composition having at least a first zeolite X having a mean diameter not greater than 2.7 microns, as determined by sedigraph analysis, and a second zeolite X, wherein the second zeolite X is obtained by converting a binder material to the second zeolite X and the binder material is in a range from 5 to 30 wt% of the zeolite X composition, and
   b. an unconverted binder material content, after conversion to the second zeolite X is complete, in a range from 0 to 3 wt% of the zeolite X composition;

   wherein the zeolite X composition has
      i. an average Si/Al framework mole ratio in a range from 1.0 to 1.5, wherein the Si/Al framework mole ratio of the first zeolite and the second zeolite may be the same or different; and
      ii. a relative LTA intensity not greater than 1.0, as determined by a x-ray diffraction (XRD) method using a source of CuKα radiation to obtain XRD intensities in range from 5° to 25° 2θ,

   wherein, the relative LTA intensity is calculated as 100 times the quotient of

$$\frac{\text{a sample LTA XRD intensity for the zeolite X}}{\text{a reference XRD intensity for a LTA zeolite reference material consisting essentially of LTA zeolite}}$$

   wherein,
      1. the sample LTA XRD intensity of the zeolite X composition is the sum of the intensities for each LTA peak with Miller indices of (2 0 0), (4 2 0), and (6 2 2) at 7.27 $\pm$ 0.16°, 16.29 $\pm$ 0.34° and 24.27 $\pm$ 0.50° 2θ, and
      2. the reference XRD intensity of the LTA-type zeolite reference material is the sum of the intensities for each LTA peak with Miller indices of (2 0 0), (4 2 0), and (6 2 2) at 7.27 $\pm$ 0.16°, 16.29 $\pm$ 0.34° and 24.27 $\pm$ 0.50° 2θ,

      wherein,

      the sample LTA XRD intensity and the reference XRD intensity are each
         a. obtained for a sodium-exchanged form of the zeolite X composition and the LTA-type zeolite reference material, respectively, and
         b. equilibrated at 50% relative humidity.

2. The zeolitic binder-converted composition of claim 1 wherein the unconverted binder material content, after conversion to the second zeolite X is complete, is in a range from 0 to 2 wt% of the zeolite X composition.

3. The zeolitic binder-converted composition of claim 1 wherein the average unit cell size of the zeolite X composition is in a range from 24.99 Å to 24.95 angstroms, as determined by XRD of a Na-exchanged form of the zeolite X composition equilibrated at 50% relative humidity.

4. The zeolitic binder-converted composition of claim 1 wherein the average unit cell size of the zeolite X composition is in a range from 24.985 Å to 24.955 angstroms, as determined by XRD of a Na-exchanged form of the zeolite X composition equilibrated at 50% relative humidity.

5. The zeolitic binder-converted composition of claim 1 wherein the average Si/Al framework mole ratio of the zeolite X composition is in a range from 1.15 to 1.35.

6. The zeolitic binder-converted composition of claim 1 wherein the LTA intensity of the zeolite X composition is not greater than 0.8.

7. The zeolitic binder-converted composition of claim 1 wherein the zeolite X is ion-exchanged with barium, potassium, and combinations thereof.

8. A process for the separation of para-xylene from a mixture of C_8 alkylaromatics, comprising contacting the mixture of C_8 alkylaromatics with the zeolitic binder-converted composition of claim 1, 2, 3, 4, 5, 6 or 7 used as an adsorbent under adsorption conditions.

9. The process of claim 8 wherein para-diethylbenzene is used to desorb the para-xylene from the zeolitic binder-converted composition and wherein the para-xylene to para-diethylbenzene selectivity is in a range from 1.15 to 1.35 at LOI=5.7 – 5.8%.

10. The process of claim 8 wherein the zeolitic binder-converted composition has an adsorbent capacity of at least 12.5 cm^3 at LOI=5.7 - 5.8%, as determined at 150°C for 70 cm^3 of the zeolitic binder-composition.

CLAIMS

1. A zeolitic binder-converted composition comprising:

a. a zeolite X composition having at least a first zeolite X having a mean diameter not greater than 2.7 microns, as determined by sedigraph analysis, and a second zeolite X, wherein the second zeolite X is obtained by converting a binder material to the second zeolite X and the binder material is in a range from 5 to 30 wt % of the zeolite X composition, and

b. an unconverted binder material content, after conversion to the second zeolite X is complete, in a range from 0 to 3 wt % of the zeolite X composition;

wherein the zeolite X composition has

i. an average Si/Al framework mole ratio in a range from 1.0 to 1.5, wherein the Si/Al framework mole ratio of the first zeolite and the second zeolite are different; and

ii. a relative LTA intensity not greater than 1.0, as determined by a x-ray diffraction (XRD) method using a source of CuKαradiation to obtain XRD intensities in range from 5° to 25° 2θ,

wherein, the relative LTA intensity is calculated as 100 times the quotient of

$$\frac{\text{a sample LTA XRD intensity for the zeolite X}}{\text{a reference XRD intensity for a LTA zeolite reference material consisting essentially of LTA zeolite}}$$

wherein,

1. the sample LTA XRD intensity of the zeolite X composition is the sum of the intensities for each LTA peak with Miller indices of (2 0 0), (4 2 0), and (6 2 2) at 7.27 ±0.16° , 16.29 ±0.34° and 24.27 ±0.50° 2θ, and

2. the reference XRD intensity of the LTA-type zeolite reference material is the sum of the intensities for each LTA peak with Miller indices of (2 0 0), (4 2 0), and (6 2 2) at 7.27 ±0.16°, 16.29 ±0.34° and 24.27 ±0.50° 2θ,

wherein,

the sample LTA XRD intensity and the reference XRD intensity are each

a. obtained for a sodium-exchanged form of the zeolite X composition and the LTA-type zeolite reference material, respectively, and

b. equilibrated at 50% relative humidity.

2. The zeolitic binder-converted composition of claim 1 wherein the unconverted binder material content, after conversion to the second zeolite X is complete, is in a range from 0 to 2 wt % of the zeolite X composition.

3. The zeolitic binder-converted composition of claim 1 wherein the average unit cell size of the zeolite X composition is in a range from 24.99 Åto 24.95 angstroms, as determined by XRD of a Na-exchanged form of the zeolite X composition equilibrated at 50% relative humidity.

4. The zeolitic binder-converted composition of claim 1 wherein the average unit cell size of the zeolite X composition is in a range from 24.985 Åto 24.955 angstroms, as determined by XRD of a Na-exchanged form of the zeolite X composition equilibrated at 50% relative humidity.

5. The zeolitic binder-converted composition of claim 1 wherein the average Si/Al framework mole ratio of the zeolite X composition is in a range from 1.15 to 1.35.

6. The zeolitic binder-converted composition of claim 1 wherein the LTA intensity of the zeolite X composition is not greater than 0.8.

7. The zeolitic binder-converted composition of claim 1 wherein the zeolite X is ion-exchanged with barium, potassium, and combinations thereof.