Part 3 – Properties of the Examples and Comparative Example

Table 2 Surface Properties of Examples 1-4 and Comparative Examples 1-4

Example #	BET-5 (m^2/g)	CTAB (m^2/g)	BET/CTAB (microporosity)	BJH Desorption SA (pores 1.7-300 nm) (m^2/g)	log_{10} BJH Desorption SA (pores 1.7-300 nm) ~~(m^2g)~~ (m^2/g)
1	357.0	188.0	1.90	188.0	2.27
CE-2	149.0	142.0	1.05	134.17	2.13
CE-3	150.0	150.0	1.00	134.7	2.13
2A	426.0	327.0	1.30	487.7	2.69
3A	655.0	420.0	1.56	728.5	2.86
2B	552.0	339.0	1.63	650.8	2.81
3B	644.0	402.0	1.60	727.8	2.86
CE-4	126.0	135.0	0.93	111.42	2.05
4	281.0	200.0	1.41	205.66	2.31
CE-1	179.0	170.0	1.05	156.98	2.20

Part 4 – Performance Testing

It is generally accepted that as the surface area of an adsorbate increases, more of the adsorbate volume is accessible. This means that even in cases where there is no chance for covalent interaction between the adsorbate and adsorbent, the adsorbate could be removed from solution by Van der Waal interactions, hydrogen bonding, pi interactions or dipole-dipole interactions. Thus, it would be expected when intermolecular forces are strong enough to retain adsorbants from solution, the adsorption capacity would increase with increased surface area. It is hypothesized that a adsorbate possessing smaller pores would be even better since physically trapping the molecule could be possible and the cumulative effect of intermolecular forces would likely be maximized.

The silica adsorption capability toward, paraquat, a relevant chemical contaminant, was assessed using a spectrophotometric method. Paraquat dichloride was purchased from Sigma Aldrich and used as received. After initial work was completed to determine the working range (detection limits) in aqueous solution, it was determined that borate buffered (0.025M) alkaline (pH=8.06) solutions of paraquat could be accurately measured between 0 and 25 ppm by following the

What is claimed is:

1. A separation medium comprising rotary dried or spray dried precipitated silica, said silica having a pore surface area P (m^2/g) wherein $\log_{10} P > 2.2$, and wherein the ratio of BET to CTAB is at least 1.0 measured prior to any surface modification of the silica., wherein said separation medium is selected from filtration membranes and adsorption membranes.

2. The separation medium of claim 1 wherein the silica has a particle size distribution wherein more than 90 percent of the silica particles have a particle diameter equal to the average particle diameter.

3. The separation medium of claim 1 wherein the silica demonstrates a BET of 20 to 900 m^2/g.

4. The separation medium of claim 3 wherein the silica demonstrates a BET of 125 to 700 m^2/g.

5. The separation medium of claim 4 wherein the silica demonstrates a BET of 190 to 350 m^2/g.

6. The separation medium of claim 4 wherein the silica demonstrates a BET of 351 to 700 m^2/g.

7. The separation medium of claim 1 wherein the silica demonstrates a CTAB of 20 to 700 m^2/g.

8. The separation medium of claim 7 wherein the silica demonstrates a CTAB of 120 to 500 m^2/g.

9. The separation medium of claim 8 wherein the silica demonstrates a CTAB of 170 to 280 m^2/g.

10. The separation medium of claim 8 wherein the silica demonstrates a CTAB of 281 to 500 m^2/g.

20. The method of claim 17 wherein the material to be separated from the fluid stream comprises a toxin.

21. The method of ~~claim 4~~claim 17 wherein the material to be separated from the fluid stream comprises a neurotoxin.

22. The method of claim 17 wherein the stream is contacted with the separation medium in a filtration membrane.

23. The method of claim 17 wherein the stream is contacted with the separation medium in a fluidized bed.