**Activated Carbon Fibers:**

**Table 1** Textural properties of the samples determined from the adsorption-desorption isotherms of N2 at -196oC.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **SBET (m2/g)** | **Smiα(m2/g)** | **Vt β (cm3/g)** | **Vmeα (cm3/g)** | **Vmiα (cm3/g)** | **Vultraα (cm3/g)** | **Smi/SBET** | **Vmi/Vt** | **Vultra/Vt** |
| ACF | 96616 | 826 | 0.4635 | 0.0427 | 0.3472 | 0.1456 | 0.892 | 0.749 | 0.314 |
| aACF | 6 | 1224 | 0.7357 | 0.1135 | 0.5028 | 0.2020 | 0.782 | 0.638 | 0.275 |
| nACF | 10 | 599 | 0.3848 | 0.0612 | 0.2610 | 0.0923 | 0.752 | 0.678 | 0.240 |

**Table 2** Curve-fitting of the Frenudlich equation for the CO2 adsorption data at different temperatures.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample** | **Temperature (◦C)** | **KF (mmole/g/kPa1/n)** | **n** | **R2** | **ARE (%)** |
| ACF | 25 | 0.134 | 1.61 | 0.9997 | 2.26 |
| 40 | 0.084 | 1.52 | 0.9996 | 2.37 |
| 55 | 0.052 | 1.43 | 0.9995 | 2.38 |
| aACF | 25 | 0.164 | 1.64 | 0.9998 | 1.89 |
| 40 | 0.102 | 1.54 | 0.9998 | 1.76 |
| 55 | 0.063 | 1.50 | 0.9993 | 1.54 |
| nACF | 25 | 0.089 | 1.59 | 0.9998 | 1.48 |
| 40 | 0.052 | 1.47 | 0.9999 | 1.06 |
| 55 | 0.031 | 1.36 | 0.9999 | 1.23 |

**Carbon Nanotubes:**

**Table 3** BET data.

|  |  |  |  |
| --- | --- | --- | --- |
| **Adsorbents** | **Surface area (m2/g)** | **Pore volume (cm3/g)** | **Pore size (nm)** |
| MWNT | 452.69 | 0.74 | 6.58 |
| PSI | 43 | 0.38 | 35.43 |
| PAA | 1.93 | 0.01 | 20.63 |
| MWN-PAA | 60.44 | 0.40 | 13.76 |

**Table 4** CO2 adsorption Capacity Average rate at 25oC.

|  |  |  |  |
| --- | --- | --- | --- |
| **Adsorbents** | **Adsorption Capacity**  **(mgCO2/g)** | **Time (minutes)** | **Average rate**  **(mgCO2/g-min)** |
| MWNT (M0) | 12.3 | 39 | 0.32 |
| PSI (P0) | 25 | 49 | 0.51 |
| PAA (P1) | 47.1 | 170 | 0.28 |
| MWN-PAA [MP]1 | 70 | 100 | 0.7 |

**Table 5** Constants of Freundlich isotherm model, regression coefficient and average relative error for adsorption of CO2 on MWNT sample.

|  |  |  |  |
| --- | --- | --- | --- |
| **Temperature (K)** | **Constants of the model** | **R-square** | **Average relative error (%)** |
| 288 | K = 0.006636  n = 1.943 | 0.9926 | 2.7 |
| 293 | K = 0.005425  n =1.918 | 0.9929 | 3.02 |
| 298 | K = 0.000908  n =1.422 | 0.9904 | 3.95 |