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(54) **ADVANCED FIRE-RESISTANT FORMS OF ACTIVATED CARBON AND METHODS OF ADSORBING AND SEPARATING GASES USING SAME**

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See application file for complete search history.

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(57) **ABSTRACT**

Advanced, fire-resistant activated carbon compositions useful in adsorbing gases; and having vastly improved fire resistance are provided, and methods for synthesizing the compositions are also provided. The advanced compositions have high gas adsorption capacities and rapid adsorption kinetics (comparable to commercially-available activated carbon), without having any intrinsic fire hazard. They also have superior performance to Mordenites in both adsorption capacities and kinetics. In addition, the advanced compositions do not pose the fibrous inhalation hazard that exists with use of Mordenites. The fire-resistant compositions combine activated carbon mixed with one or more hydrated and/or carbonate-containing minerals that release H<sub>2</sub>O and/or CO<sub>2</sub> when heated. This effect raises the spontaneous ignition temperature to over 500° C. in most examples, and over 800° C. in some examples. Also provided are methods for removing and/or separating target gases, such as Krypton or Argon, from a gas stream by using such advanced activated carbons.

**5 Claims, 11 Drawing Sheets**