SILICA GEL COMPOSITIONS CONTAINING ALKALI METALS AND ALKALI METAL ALLOYS

ABSTRACT

The invention relates to Group 1 metal/silica gel compositions comprising silica gel and an alkali metal or an alkali metal alloy. The compositions of the inventions are described as Stage 0, I, II, and III materials. These materials differ in their preparation and chemical reactivity. Each successive stage may be prepared directly using the methods described below or from an earlier stage material. Stage 0 materials may, for example, be prepared using liquid alloys of Na and K which are rapidly absorbed by silica gel (porous Si02) under isothermal conditions, preferably at or just above room temperature, to form loose black powders that retain much of the reducing ability of the parent metals. When the low melting Group 1 metals are absorbed into the silica gel, a mild exothermic reaction produces Stage I material, loose black powders that are indefinitely stable in dry air. Subsequent heating to 400°C produces Stage II materials, which are also loose black powders. Further heating above 400°C forms Stage III material with release of some Group 1 metal. It is believed that Stage I, II and III materials represent reductions of the silica gel after absorption of the Group 1 metal. Preferred Group 1 metal/silica gel compositions of the invention are those containing sodium, potassium, or sodium-potassium alloys with sodium and sodium- potassium alloys being most preferred. Each stage of the Group 1 metal/silica gel composition of the invention may be used as a reducing agent reacting with a number of reducible organic materials in the same manner known for alkali metals and their alloys.

Figure 1