

## A Simple Method for Purifying Silica Gel for Column Chromatography

Chemical products are often purified by column chromatography<sup>1-3</sup>. Silica gel is the most common adsorbent for this purpose but is very expensive and also not suitable for multiple chromatography separations. Generally, several pounds of silica gel is accumulated during lab experiments from undergraduate courses. However, this used silica gel is impure, and the procedures available for its purification are long and too tedious for chemistry students. The procedure using sodium hypochlorite solution (8–10%) is quick and efficient and requires only one laboratory period.

### Experimental

Add 300–500 g of dry silica gel (to be purified) to a 1-L beaker containing 500 mL distilled water. Heat the contents of the beaker to boiling with a hot plate (open flame can be also used). Add, dropwise, 40–60 mL of aqueous sodium hypochlorite to the mixture and keep the heating for 1 h. Caution: Check The pH of the NaOCl solution during the addition. If it is basic it may dissolve the silica gel. Allow the mixture to cool to room temperature, and decant the liquid. Wash the solid with three portions of 500 mL distilled water, followed by three portions of 500 mL 1 N hydrochloric acid solution, and again with distilled water until pH = 5.5–6.0 is reached. The washing removes residual sodium hypochlorite and sodium chloride. Let the silica gel to dry in a dust-free place, and activate it in an oven at 100 °C for 1 h before use. The yield ranged between 75–85%.

A mixture of azo-dye standards was chromatographically separated using both brand-new silica gel and the adsorbent purified by this method. The adsorptive capacity of the purified silica was thus tested and proved by the student to be adequate. We have conducted this laboratory activity for the past year and consider the educational result extremely gratifying for teacher and students.

---

<sup>1</sup> Heftman, E., Ed. *Chromatography*; Reinhold: New York, 1961.

<sup>2</sup> Srivastava, V. K.; Srivastava, K. K. *Introduction of Chromatography*; Chand: New Delhi, 1985.

<sup>3</sup> Miller, J. M., Ed. *Separation Methods in Chemical Analysis*; Wiley-Interscience: New York, 1975.

<sup>4</sup> Author to whom correspondence should be addressed.

Antonio E. Guarconi and Victor F. Ferreira<sup>4</sup>

Universidade Federal Fluminense  
24.000-Niterói  
Rio de Janeiro, Brazil