http://www.nobelprize.org/nobel_prizes/chemistry/laureates/2003/

Peter Agre **Roderick MacKinnon**

The Nobel Prize in Chemistry 2003 was awarded *"for discoveries concerning channels in cell membranes"* jointly with one half to Peter Agre *"for the discovery of water channels"* and with one half to Roderick MacKinnon *"for structural and mechanistic studies of ion channels"*.

Science
AAAS

The Structure of the Potassium Channel: Molecular Basis of K^+ Conduction and Selectivity

Declan A. Doyle, João Morais Cabral, Richard A. Pfuetzner, Anling Kuo, Jacqueline M. Gulbis, Steven L. Cohen, Brian T. Chait, Roderick MacKinnon*

Science **280**, 69 (1998);
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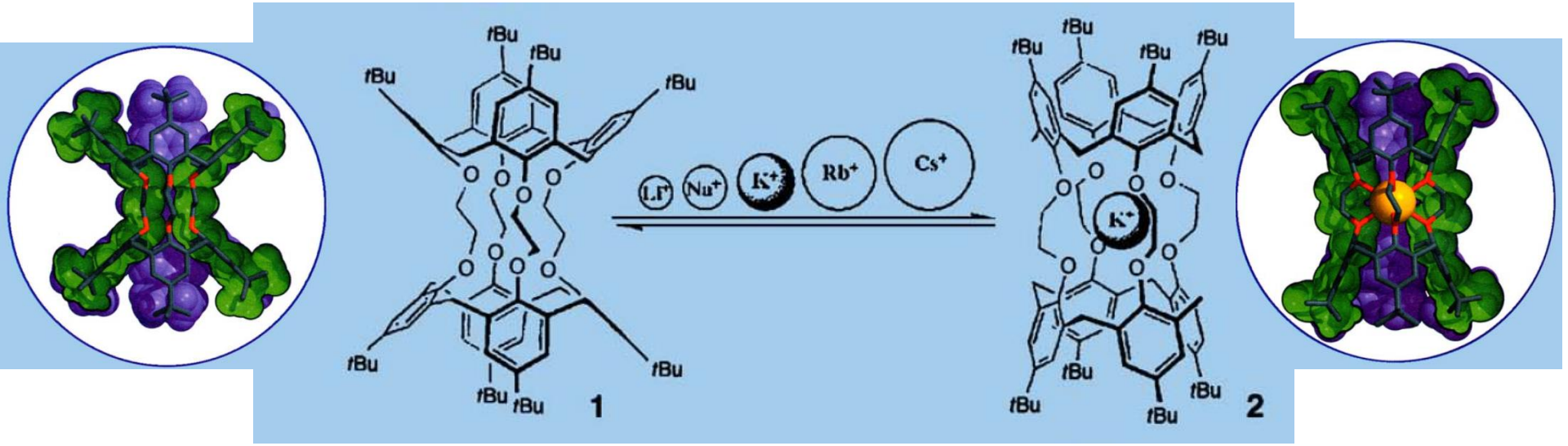
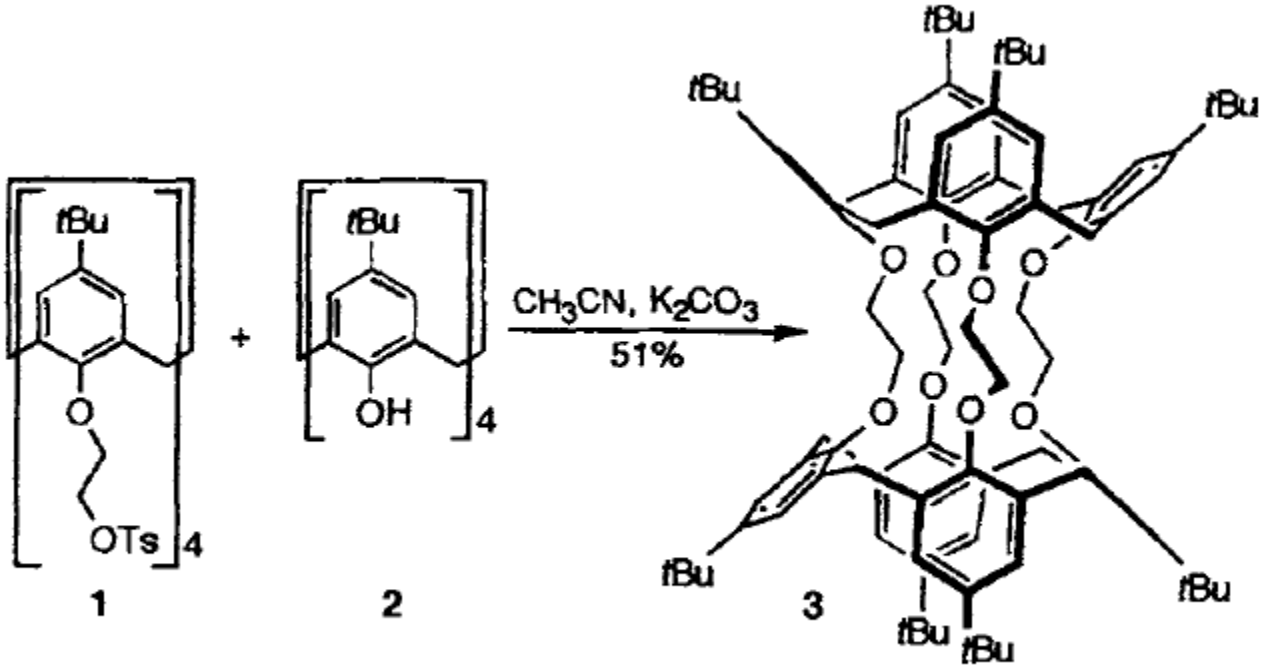
Calix[4]tube: A Tubular Receptor with Remarkable Potassium Ion Selectivity**

Philippe Schmitt, Paul D. Beer,* Michael G. B. Drew, and Paul D. Sheen

Angew. Chem. Int. Ed. Engl. **1997**, *36*, 1840





Scheme 1. Synthesis of the calix[4]tube **3**.

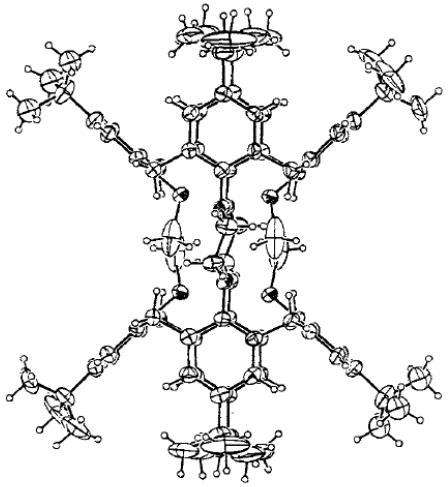


Figure 1. Crystal structure of the centrosymmetric calix[4]tube **3** in $3 \cdot 2.5\,C_6H_6$, with ellipsoids at 30% probability. Hydrogen atoms are included with small arbitrary radii. The benzene solvent molecules are not shown.

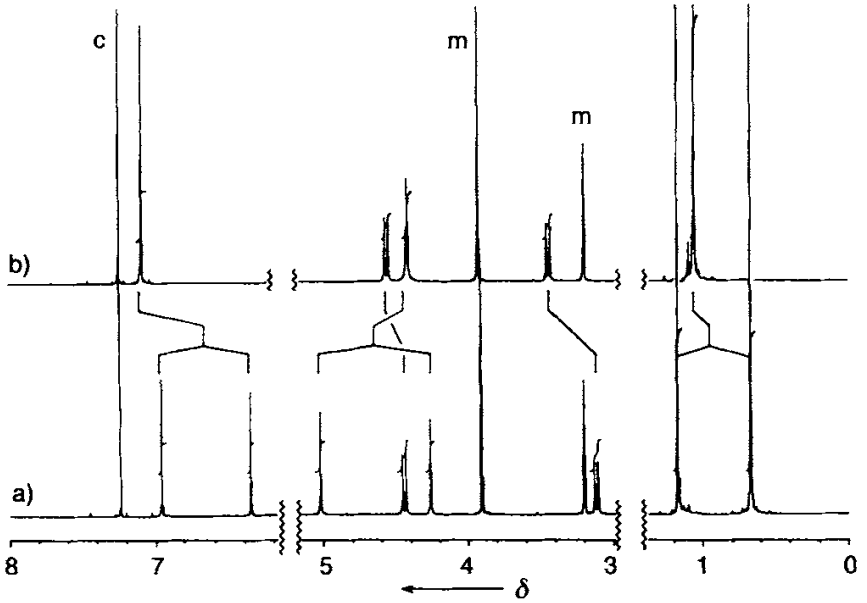


Figure 2. ^1H NMR spectrum of **3** [500 MHz, $CDCl_3/CD_3OD$ 4/1 (v/v)]: a) pure, b) with 10 equivalents of solid potassium iodide (c, m: solvent peaks corresponding to chloroform and methanol, respectively).

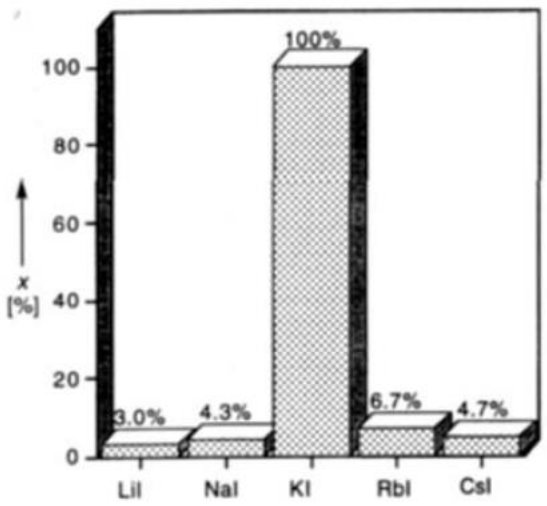


Figure 3. Uptake of alkali metal ions by **3** after treating its chloroform-methanol solution (4/1, [**3**] = 1 mM) with 10 equivalents of alkali metal iodide. The complexation ratio x was determined by integration of the ^{1}H NMR spectra after the samples had been left to stand for 90 h. In the case of KI, equilibrium was reached within an hour.

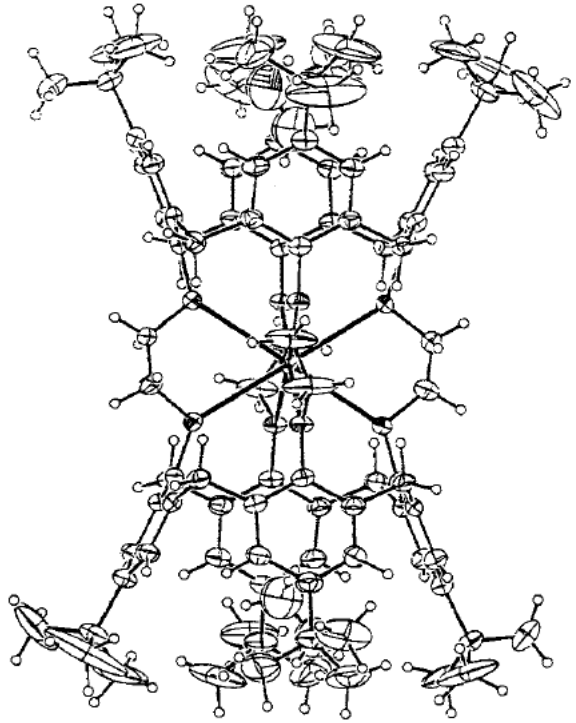
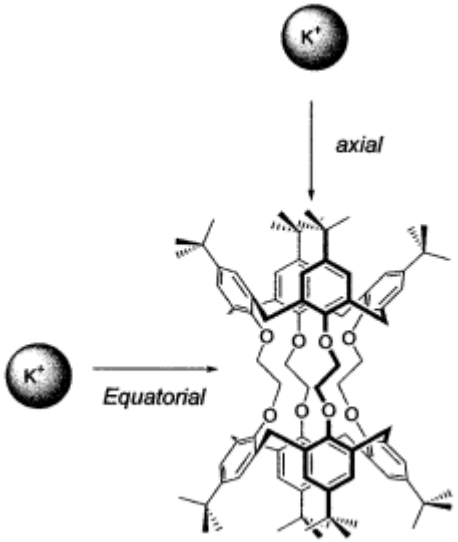
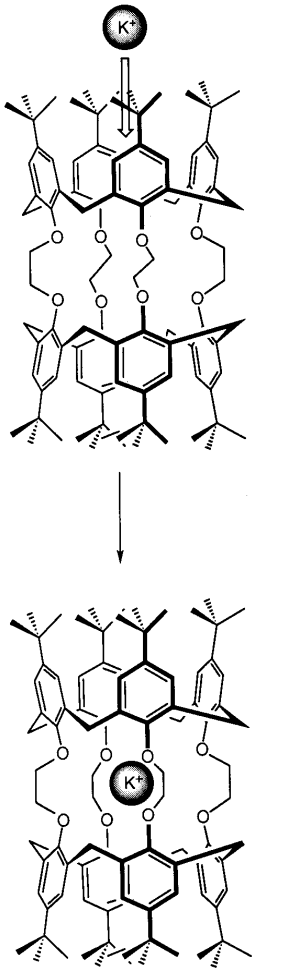


Figure 4. Structure of the K^+ complex **4** of the calix[4]tube **3** in crystals of **4**·I·3 $CHCl_3$·4 CH_3OH·H_2O. A potassium ion is located in the center of **3**, and two methanol molecules in the cone cavities. Ellipsoids are drawn at 30% probability. Hydrogen atoms are included with small arbitrary radii. The chloroform and water solvent molecules are not shown.

Calix-tubes





Potassium encapsulation in calix[4]tube