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A CONDUCTIMETRIC DETECTOR FOR FLOW INJECTION ANALYSIS

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INTRODUCTION

In flow injection analysis, FIA, small volume detectors are usually needed. In the case of conductimetric flow detection, the construction of an adequate cell is not a trivial process. Pasquini and Faria[1] describe an adequate cell constructed from stainless steel that furnishes good results[2,3]. For the construction of that cell, however, considerable lathe work is necessary and the resulting cell is relatively large and heavy. The necessity to obtain smaller and more sensitive cells led us to develop an easy to build cell.

The cell described in this communication consists of two needles, one (the external tube) with 2.0 mm external diameter (e.d.) and 1.8 mm internal diameter (i.d.) and the other (the internal tube) with 1.2 e.d. and 1.0 i.d. However cells with the external tube having 1.8 mm i.d. and the internal tube having 1.5 e.d. have already been constructed. Therefore, cells with very small volumes (e.g., from about 7 microliters) can easily be built. The cell described in this communication has a volume of about 42μL.

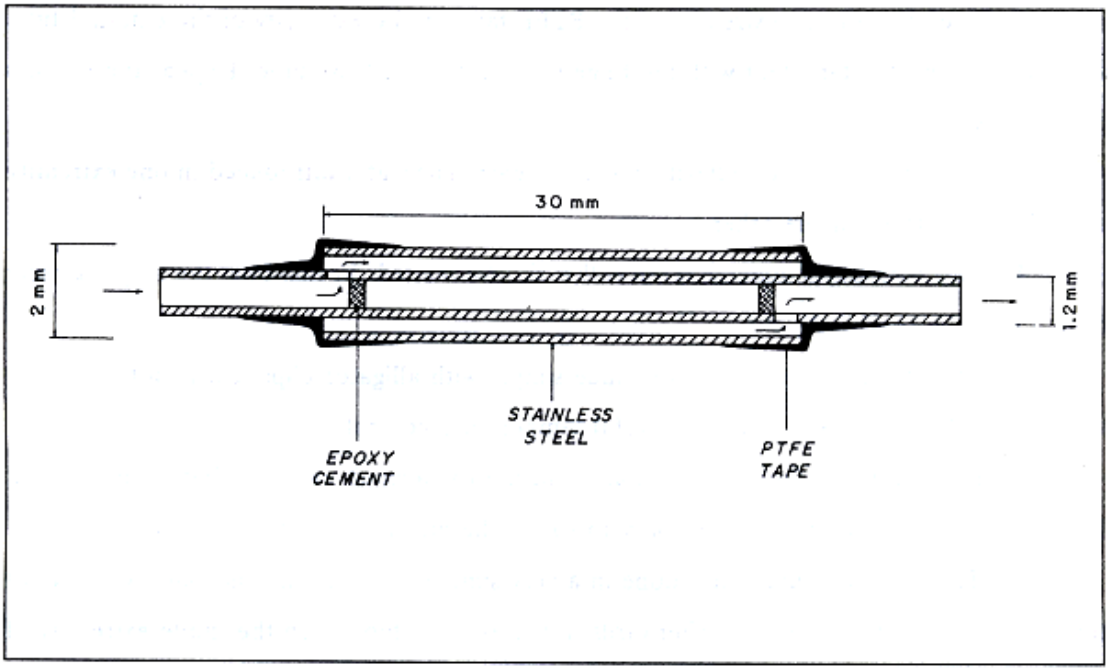
The constant of such a cell is about 0.20 to 0.25 cm^{-1}.

MATERIAL

To construct a such cell all we need is, essentially, two small pieces of adequate diameter stainless steel tubing, PTFE tape, epoxy cement and a small file.

The tubes used were obtained from stainless steel syringe needles.

The figure describes the cell.



PROCEDURE

1. With the file carefully cut the tubes to the desired lengths.

2. To remove the burrs use the edge of an usual small syringe needle (work syringe).

3. In the internal tube (the longer), using the file, carefully, make a hole close to each extremity (side holes). Withdraw the burrs with the edge of the work syringe.

4. Into these two holes made in the tube, introduce a small amount of epoxy cement and place it adequately with the work syringe according to the figure.

5. When the epoxy cement becomes rigid, the flow within the internal tube can be tested using a water stream. This flow is adequate when water introduced in one extremity flows only out the next side hole.

6. Clean the tubes with a cloth wet with ethanol to remove grease.

7. Cut two pieces of PTFE tape (about 1.5 x 3 cm).

8. Introduce the internal tube into the external by placing the side holes close to the extremities of the later.

9. Carefully put one extremity of the PTFE tape on the extremity of the external tube and, maintaining the tape taut with the fingers, twist it around the tube. Repeat the process on the other side.

10. Test the flow of the cell with a water stream. The water introduced in one extremity must flow only through the other.

11. Test with an ohmmeter if the cell is short-circuited. In this case the steps starting from 7 must be repeated.

12. The electric contacts can be made simply with alligator clips if it is not necessary to put the cell into a water bath for careful temperature control.

13. If the use of a thermostated bath is necessary, a small glycerine bath can be used. If a water bath is required it is necessary to solder the electric contacts onto the cell.

14. The electric contacts are done in a very simple manner. Around one extremity of the internal tube of the cell, and afterwards in the external tube, turn the nude extremity of a thin "plastified" copper wire three times. Solder with a small amount of tin around the turns of the wire to form a ring. When the tin cools its contraction leads to a good electrical contact.

15. Wrap the cell and the electric contacts with the PTFE tape, turning it around for two or three rounds to isolate it from water.

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