CHAPTER V

CONCLUSION

Though procedure described in this work was in principle similar to Darrall's experiment (17), it was in expermental details partially different from Darrall's method. In the former the particle size and weight of silica gel used were less than the later. The temperature of the adsorbing unit was also different. In this work, the alcoholic liquid nitrogen slurry was used as a coolant whereas in Darrall's work the liquid nitrogen vapor was used. PPO and Dimethyl POPOP in toluene was employed as liquid scintillator in stead of the NE 233 toluene based liquid scintillator.

In the present investigation a de-emanation line was built in the laboratory and set-up to remove radon-222 from a solution containing radium-226. The quantitative de-emanation was achieved by passing nitrogen gas in a volume 15 time that of the de-emanation solution. The emanated radon was adsorbed on 2 g of silica gel with a mesh size between 35 and 70 at the temperature of an alcoholic liquid nitrogen slurry. The silica gel was transferred at $0^{\circ}c$ to a toluene-based liquid scintillator in a glass vial and the activity was then counted with a liquid scintillation counter. An efficiency of 3.5 $cpmPci^{-1}$ with a background count rate of 4 cpm was obtained. The detection limit was determined through the experimental being equal to 1 Pci of radon. The recovery yield of the whole process was checked by analysing a standard uranium ore, NBL 74 A,

from the New Brunsvick Laboratory. An average recovery yield of 99.67 $\pm$ 0.54 was obtained from 10 separate experiments.

Obviously if was quite reasonable to consider that the developed method could be practical and applicable in the quantitative routine analyses and also comparable to Darrall's method since its efficiency value was not significantly different from the Darrall's efficiency. Generally the detection limit reported in the literatures was one - tenth of the background count rate (15), in the author's opinion this was not always valid and in some case it was not practical, in this work the detection limit was therefore obtained by performing experiments. Based on the detection limit generally cited in various publications, the detection limit obtained from this work would be definitely better than those quoted elsewhere.

The method could be applicable in the analysis of radium in environmental samples, such as, soil, plant and water samples. The content of radium in soil, plant and water is in the order of 5×10^{-2} $Pcig^{-1}$, 5×10^{-3} $pcig^{-1}$ and 5×10^{-1} $Pcil^{-1}$ respectively (15). Based on the detection limit of the method developed in this thesis, it is recommended that 20 g of soil sample or 200 g of plant sample or 2 l of water sample would be sufficient for the experiment.