



# **Educational and research aspects of homemade modular PC-controlled radiochemistry systems for the processing of irradiated electroplated solid cyclotron targets**

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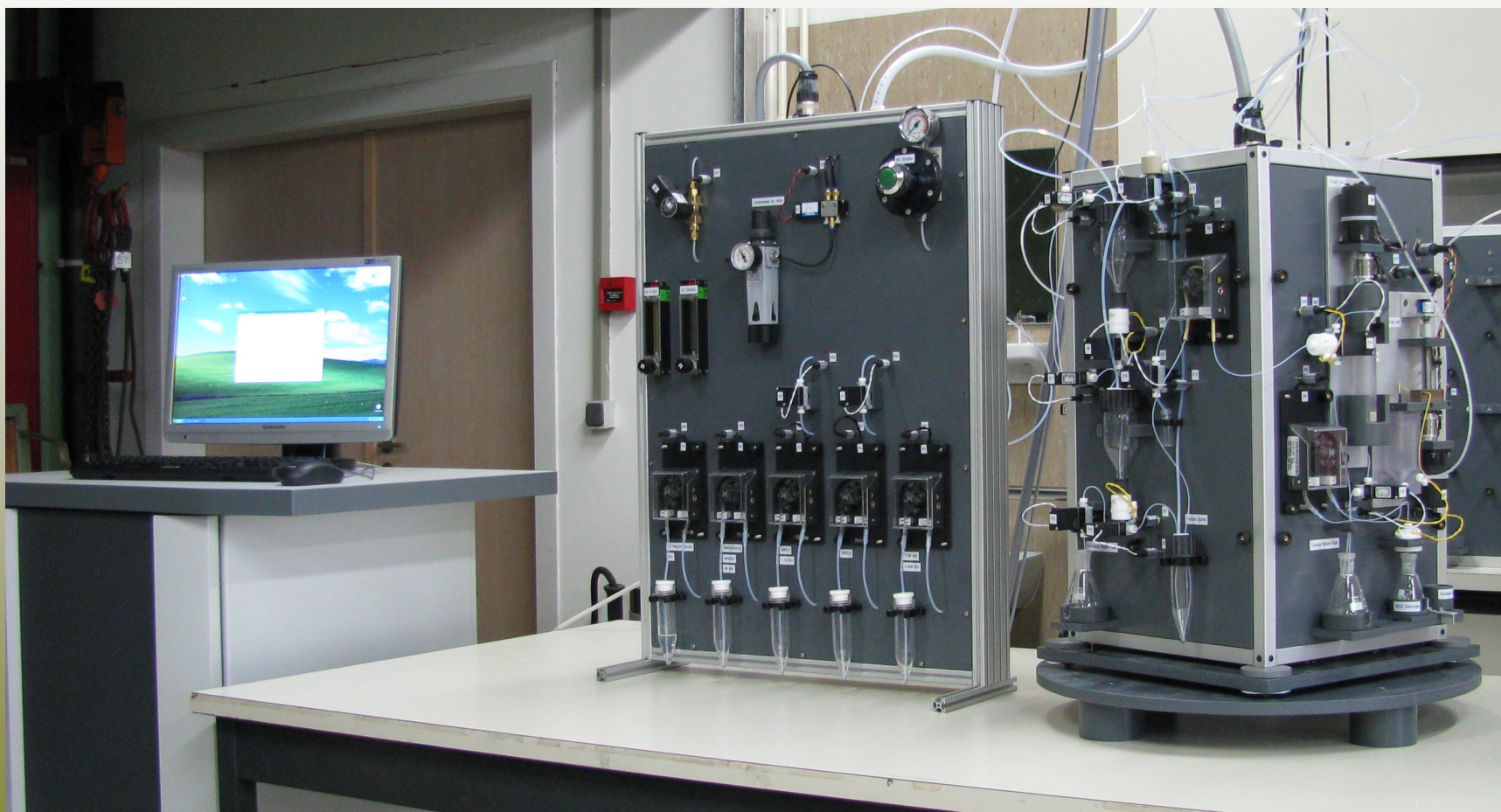


# Introduction

- **A large part of medically relevant radionuclides is presently produced by thermal neutron induced reactions**
- **Some of these radioisotopes can be obtained in acceptable quantities by charged particle induced reactions**
- **The separation of target and activation product is required**
- **Classical analytical separation techniques such as selective dissolution of target layers, co-precipitation and re-dissolution of precipitates, liquid extraction, ion exchange chromatography et cetera can be used.**
- **When dealing with highly radioactive materials special care should be taken of appropriate shielding to minimize the exposure risk of the staff.**



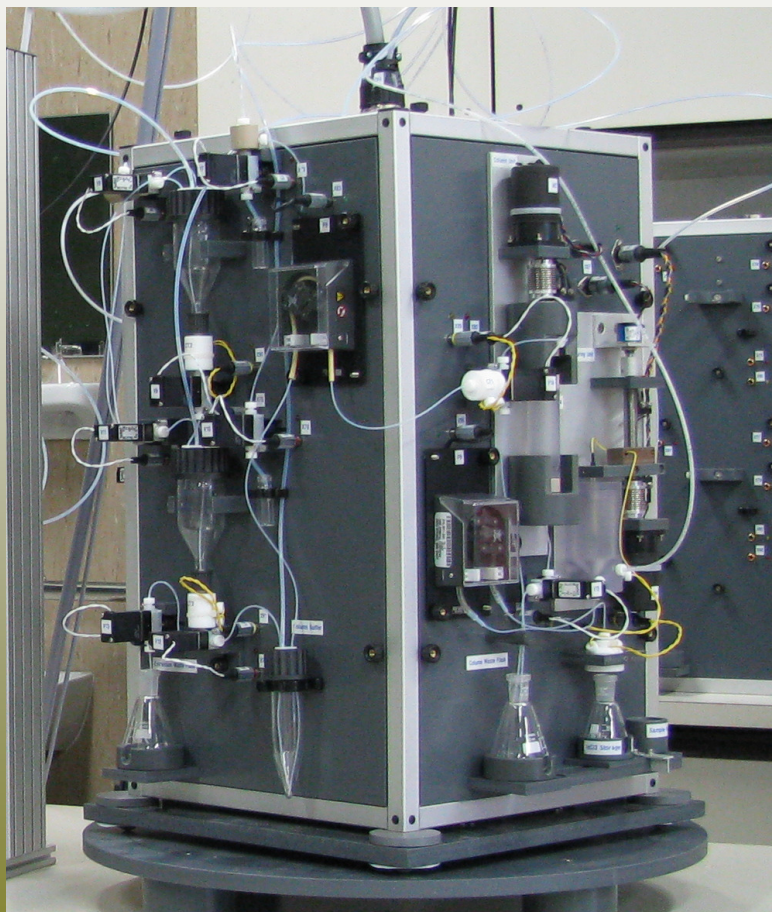
## Overview of the homemade modular PC-controlled radiochemistry system for the $^{111}\text{In}$







## Manifold and Control Unit

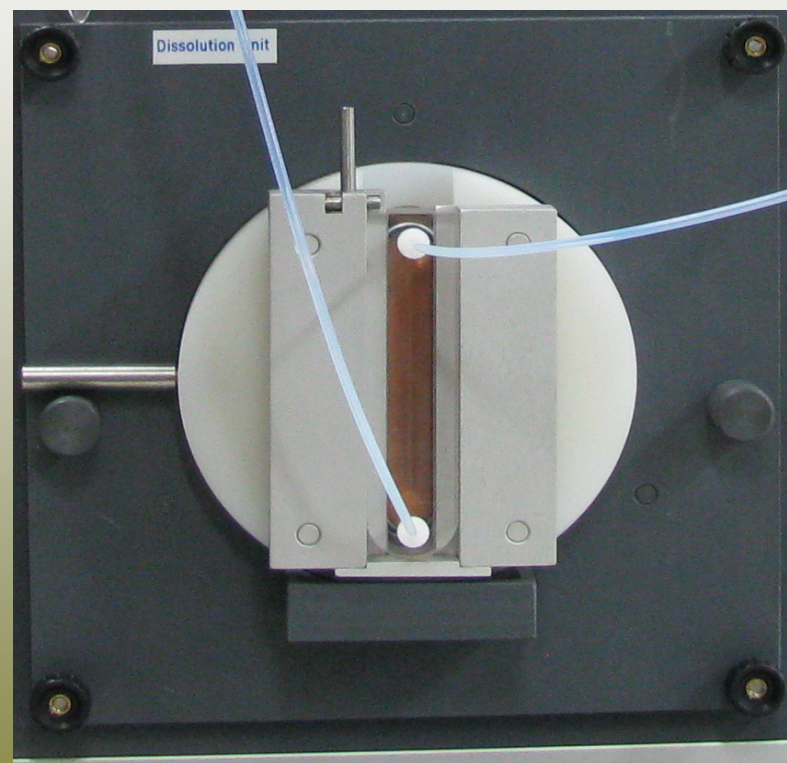
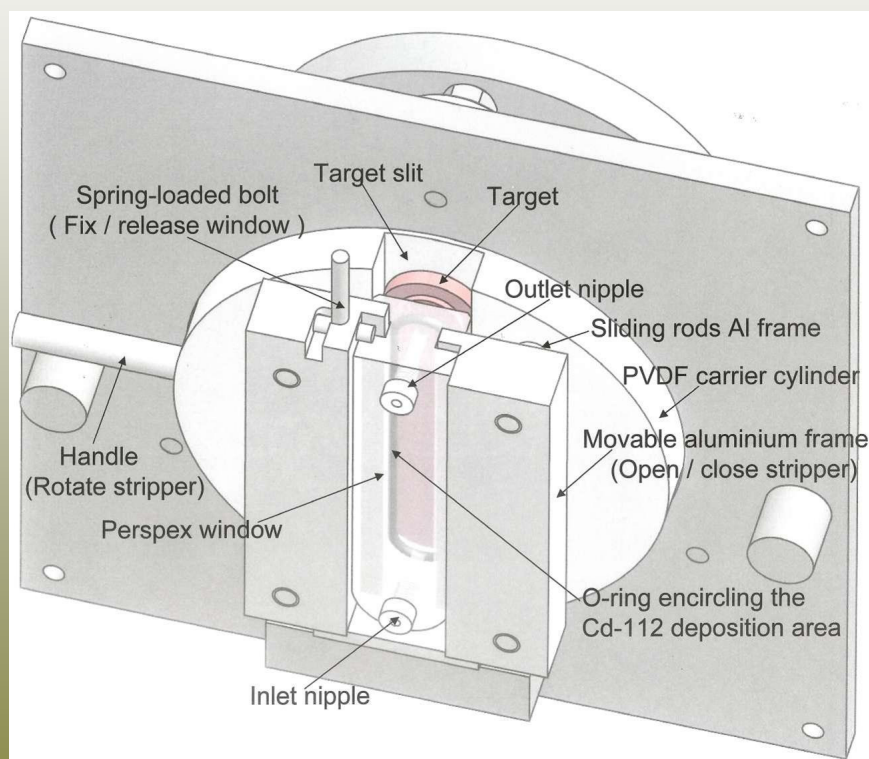


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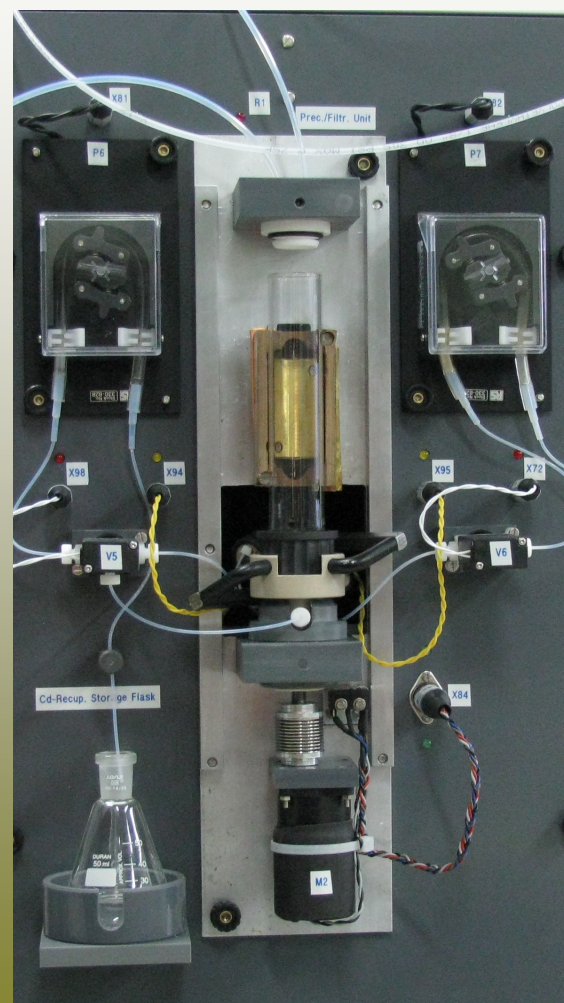
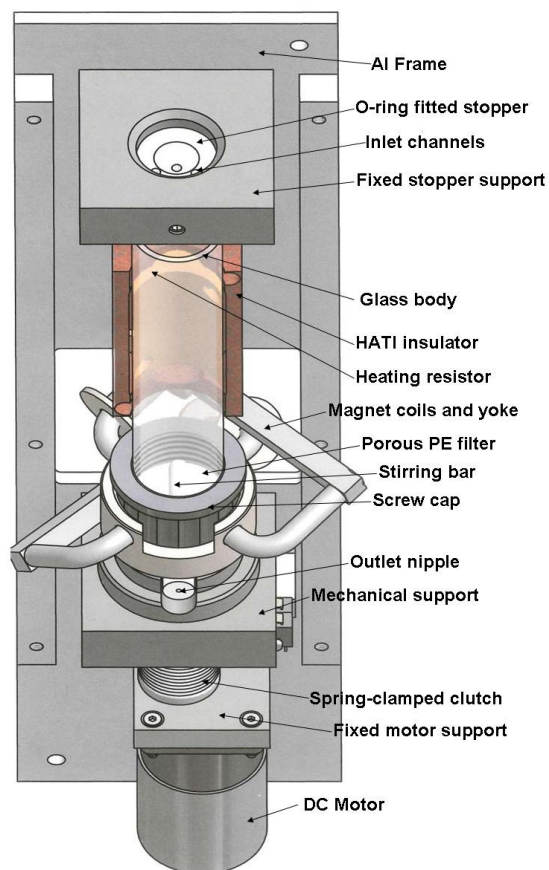
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# Selective dissolution



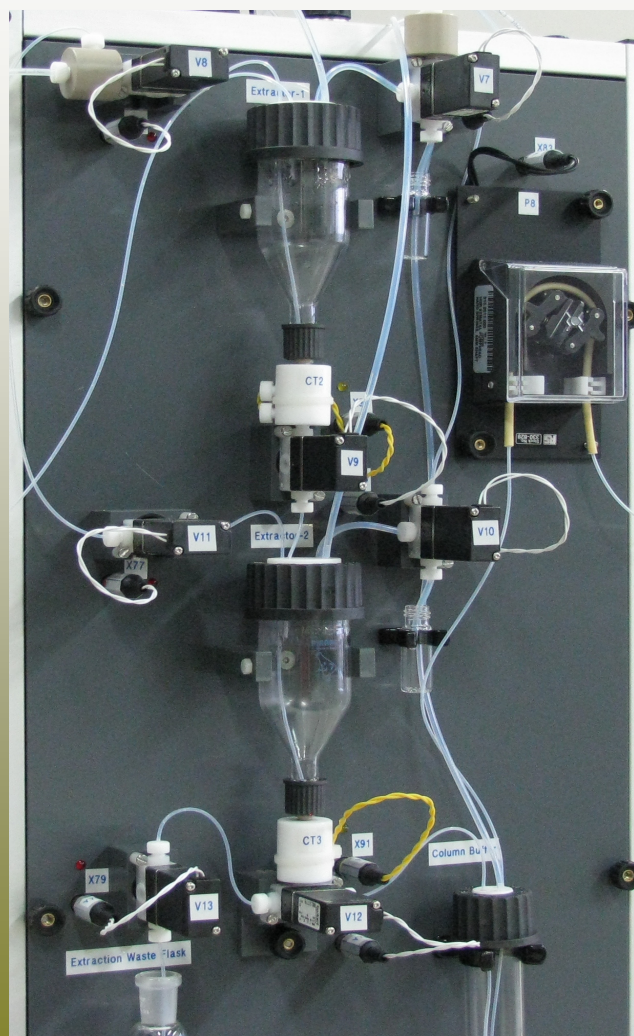
# Co-precipitation/filtration unit







# Overview of extractor unit

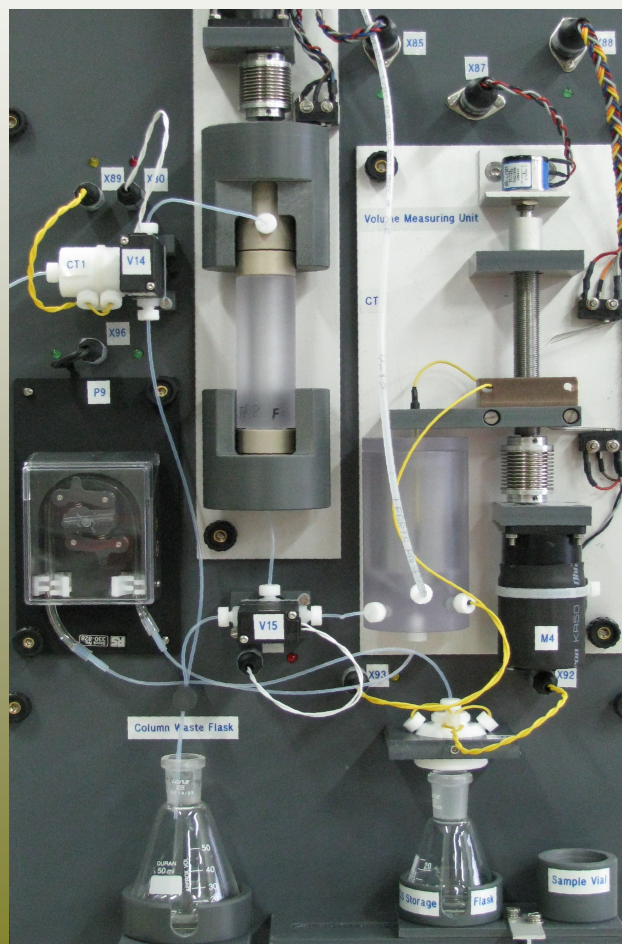


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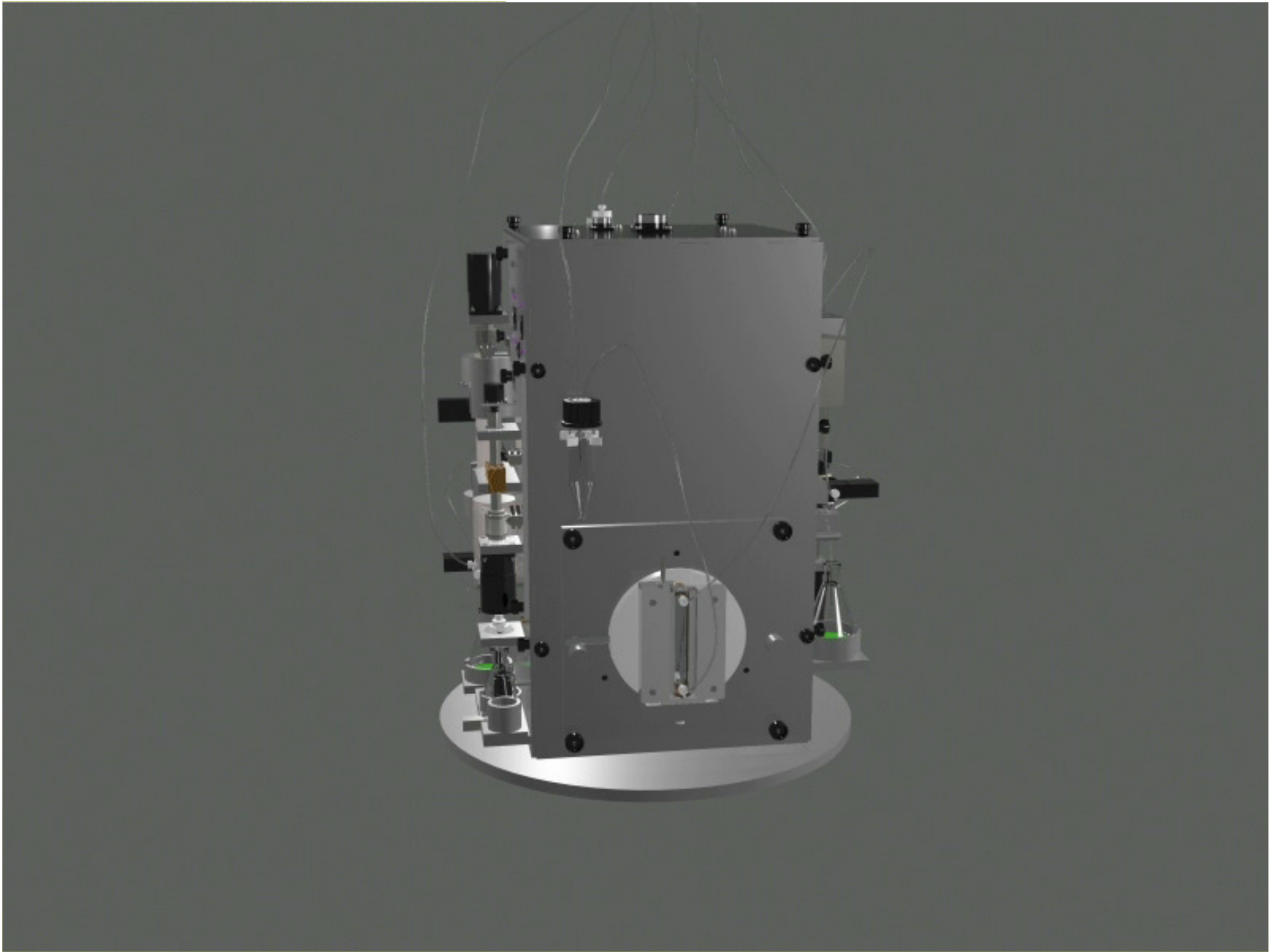
## Picture of chromatographic column, volume measuring and drop counter assembly



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# Conclusions

- The experience gathered in the last decades in our laboratory allowed us to develop a set of compact, modular radiochemistry systems.
- With a minimum change in the design of the systems, techniques such as precipitation, co-precipitation, liquid-liquid extraction and (ion exchange) chromatography, can be easily combined and applied for the separation of a variety of non-carrier-added radionuclides with an overall yield higher than 90% within 1.5 hour.
- Most of the parts of the assemblies are home made and can be easily adapted whenever required, minimizing in that way the costs of development.
- The user friendly Visual Basic interface coupled up with the manifold/external panel assemblages via the home made electronic interfaces allows the full control over each step of the chemistry with a minimum risk of operator errors and of radiation exposure for the staff.