45:The Synthesis of Deuterated Polyethylene Targets

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Introduction

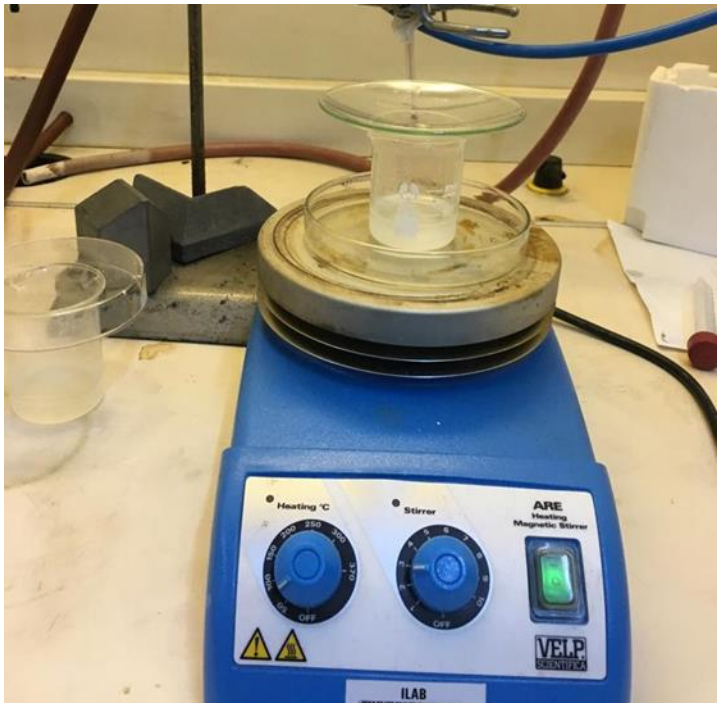
- Thin and thick targets were required- for inverse kinematics reaction study.
- Required- thin and thick strong targets that could withstand at least 2 Hr under beam bombardment.
- known popular methods for PE targets – solvent dissolution and hot pressing of the CD_2. (Arnison, 1966, Kushura, 1970).
- Vacuum evaporation it has a disadvantage, more material is wasted (not cost effective for expensive material).

Synthesis process

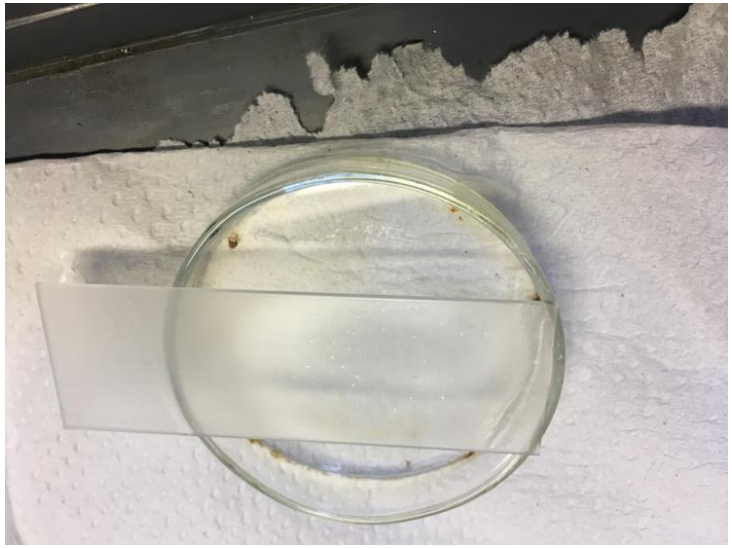
Method development and targets manufacturing

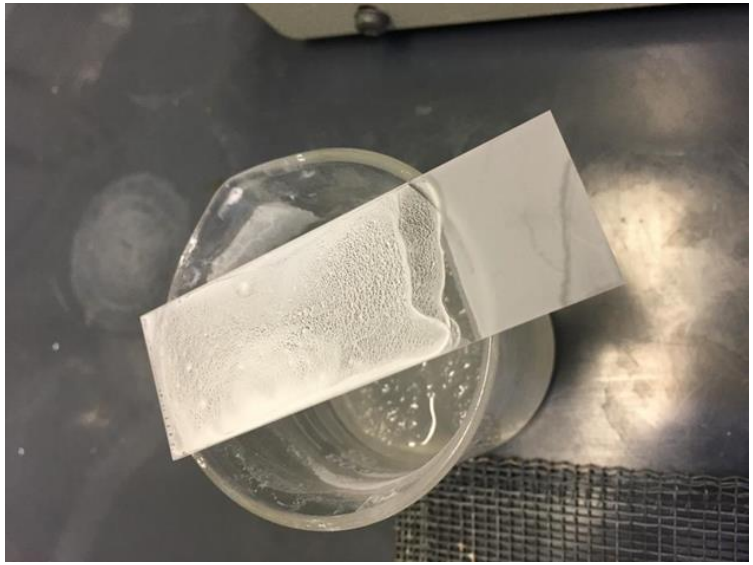
- Thin targets were initially requested-100 µg/cm^2 (should have the resemblance of a cling wrap ☺).
- Natural polyethylene –method development as CD_2 supplied at high cost.
- Various masses of PE were used during the method development starting from few mg - 50 mg to 1 g.
- The volume of Xylenes solvent was 40 ml and heated the reactants whilst stirring. The temperature of the hot plate was slowly increased in small increments.
- The solution was left stirring at the temperature near boiling point for Xylene for 30 min.
- Switching off the heat was also done in small increments adjustments, and the solution was stirred until was completely cooled.

Heating of PE/C_2D_4 in Xylene solution



Dipped slides





Heating and floating off the C_2D_2film

- Hot to boiling water was used for floating off.
- Slides were fully immersed in hot water.
- Thinner targets- firstly heated on hot plate and floated of in hot water as well.
- No parting agent was use.

Heating of C_2D_2 on hot plate

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