

SUCCESSFUL PRODUCTION OF F-18 FLUORODEOXYGLUCOSE
USING F-18 ION PRODUCED IN A NICKEL-PLATED COPPER TARGET

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Over eleven months, 195 batches of 2-[F-18]fluoro-2-deoxy-D-glucose (FDG) were made from F-18 ion produced in a nickel-plated copper O-18 water target with a computer-controlled synthesis unit using a modification of the stereo-specific method of Hamacher et al. After an early period of low FDG yields attributed to impaired fluoride reactivity, optimization of the synthesis was attempted. Potassium ion concentration was increased four-fold, drying time was reduced by half and fluorination temperature was increased. The use of recrystallized triflate also resulted in higher yields; this was perhaps the most effective change. Higher currents on target were facilitated by water-cooling the energy degrader required by the use of an 11 MeV target on our 27 MeV cyclotron. There is also some evidence that fluoride reactivity may be improved with continued target use until the target's demise due to failure of the degrader. The result of these several changes is that monthly average FDG yields, corrected to end-of-bombardment (EOB) increased from 38% in the first month to 65% for the eleventh month, and maximum yields improved from 54% to 70%. Maximum [average] FDG activities increased from 102 [66] mCi to 348 [278] mCi over the same period. Thus, a nickel-plated copper O-18 water target produced F-18 fluoride ion which had undiminished reactivity with continuing use, and which, with modification of the original synthesis, was successfully synthesized into required amounts of FDG.