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## Production of $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ generator using Szilard-Chalmers reaction

*Thursday, 15 May 2014 17:30 (1h 15m)*Production of  $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$  generator using Szilard-Chalmers reaction

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We proposed and propel a  $^{99}\text{Mo}$  production project via the  $^{100}\text{Mo}(n,2n)^{99}\text{Mo}$  reaction using fast neutrons from accelerator.<sup>(1,2)</sup> Only low specific radioactive  $^{99}\text{Mo}$ , however, can be obtained in this method. In our project,  $^{99\text{m}}\text{Tc}$  would be extracted from low specific radioactive molybdenum irradiated target, and then technetium labeled compounds from the purified  $^{99\text{m}}\text{Tc}$  will be synthesized and deliver to the end user. Although labeled technetium compounds would be available, small scale technetium generator is still required in medical facilities. In this paper, feasibility study of production of high specific radioactive  $^{99}\text{Mo}$  using Szilard-Chalmers reaction from molybdenum nanoparticle target with accelerator neutron reactions was carried out.

As neutron irradiation target, molybdenum nanoparticles were prepared by grinding with potassium chloride (KCl) powder, then pressed into a 10mm diameter disk. About 1.2 gram of the Mo/KCl target which contained about 100 mg molybdenum nanoparticles was irradiated with accelerator neutrons for 5 hours. After fast irradiation, the Mo/KCl target was dissolved in pure water, then solution and molybdenum nanoparticles were separated by centrifuge method. The solution contained recoiled  $^{99}\text{Mo}$  ion by fast neutron reactions was poured into alumina column. About 7% of  $^{99}\text{Mo}$  produced in the Mo/KCl target was absorbed onto the alumina column. Technetium- $^{99\text{m}}$  was obtained by pouring saline solution through the alumina column of immobilized  $^{99}\text{Mo}$ .

### References

- 1) Y. Nagai and Y. Hatsukawa, J. Phys. Soc. Jpn, 78 (2009) 033201
- 2) Y. Nagai et al., J. Phys. Soc. Jpn, 82 (2013) 064201

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