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An Enrichment System for Precise Dating with ^{39}Ar

^{39}Ar is a dispensable isotope in the research of climate and geology change of the earth with water or glacier dating in the range of 50~1000 years. But the very low abundance of ^{39}Ar in the sample has made this technology hard to be widely used. We have successfully developed a ^{39}Ar enrichment system that can enhance the abundance of ^{39}Ar in the enriched sample by a factor of more than 100, while preserving the original information of the reference isotope. Combined with the Atom Trap Trace Analysis (ATTA) method, precise and quick ^{39}Ar dating study becomes possible. After the work presented at ICIS-2019, we have conducted a series of comprehensive experiments to demonstrate the effectiveness, stability and reliability of the enrichment system with the cross-check operation of ^{39}Ar -ATTA. The latest experimental results show that this system could work stably with small sample (as low as 0.5 mL), and the enrichment process could preserve crucial sample information well with small errors.

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