

TELEDYNE HASTINGS INSTRUMENTS

APPLICATION NOTES

Goal: Rare Isotope Measurements with Mass Flow Controllers

Solution: Teledyne Hastings HFC-302 Flow Controller



The abundance and isotopic compositions of the noble gases such as Helium, Neon, Argon, Krypton and Xenon from mantle-derived samples provide useful and unique information concerning origin, evolution and terrestrial components of the Earth's surface.

One user is currently developing technology to determine the isotopic ratios of Helium (^3He) for applications in age dating of groundwater methods. The use of ^3He results in an unambiguous determination of the year in which the water infiltrated the water tables. These ^3He methods use two systems, which are in operation at the noble gas laboratory of a well-known observatory. The systems are assembled with commercially available mass spectrometers fed by HFC-302 mass flow controllers and are equipped with specially designed sample inlet and purification systems including a series of cryogenically cooled traps for removal of water and permanent gases, as well as for separation of helium from neon. Neon isotopes are measured simultaneously to the helium isotope measurements in quadruple mass spectrometers.