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SEOP polarization of 3He and 129Xe at high volumetric rates¹ I. RUSET², Xemed LLC and University of New Hampshire, D. WATT, J. DIS-TELBRINK, J. BRACKETT, J. KETEL, S. KETEL, W. PORTER, Xemed LLC, Durham, New Hampshire, T. UPTON, University of New Hampshire, W. HERSMAN³, University of New Hampshire and Xemed LLC — New regimes for production of polarized 3He and 129Xe using Spin Exchange Optical Pumping are under study for the purpose of increasing volumetric production rates, output polarization, or both. For polarized 129Xe production, photon efficiency is increased by polarizing at low xenon partial pressure. Higher spin exchange rates between alkali atoms and the xenon nucleus are accessed by exploiting longer lived van der Waals molecules at lower buffer gas pressures. High production rates are accomplished by flowing at high volumetric rates and illuminating with a high power, narrowed line laser. Polarizations of 129Xe exceeding 70% at production rates of 3 SLPH were observed. For polarized 3He production, efficiency is maximized by selecting a high operating temperature and an alkali mixture rich in potassium. High volumetric production rate is accomplished by illuminating a large 8 L high-pressure 3He reservoir with a high power (broad) diode stack. We estimate that 50 L can be polarized through three exponential ramp-up times in 12 hours, yielding as much as 100 L/day. Asymptotic 3He polarization will be reported.

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