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Incorporating Metal into Polarized ^{3}He Target Cells DANIEL J. MATYAS, MADUKA M. KALUARACHCHI, SUMUDU K. KATUGAMPOLA, YUNXIAO WANG, VLADIMIR NELYUBIN, WILLIAM A. TOBIAS, GORDON D. CATES, University of Virginia — Historically, high-pressure gaseous polarized ^{3}He targets at Jefferson Lab (JLab) have utilized "target cells" fabricated entirely out of glass. With the 12 GeV upgrade nearing completion, experiments requiring significantly higher luminosities are planned, and to meet the challenge, metal end windows are being developed through which the electrons will enter and exit the target cell. The polarization technique used in ^{3}He targets at Jefferson Lab utilizes spin-exchange collisions between ^{3}He atoms and alkali-metal atoms polarized through optical pumping. Unfortunately, relatively few studies have investigated the spin relaxation of nuclear-polarized noble gases on metal surfaces, particularly under the conditions in our targets. We have tested various cells incorporating both glass and metal and have found that acceptable spin-relaxation rates can be obtained by electroplating gold coatings on OFHC copper substrates. Initial tests using titanium substrates, a better material for end windows, have not yet been as successful as copper ones. These studies have produced multiple cells that demonstrate the viability of ^{3}He targets incorporating metal windows into their design.

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