

# Study of Li Diffusion on Metal and Semiconductor Surfaces via NQI

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Nuclear magnetic resonance has been used to study the diffusion of lithium on a Ru(001) single crystal surface. The quadrupolar interaction of the radioactive probe nucleus  $^8\text{Li}$  was utilized for this. In an online experiment the  $^8\text{Li}$  nuclei are produced, thermalized and highly polarized before they land on the surface studied, the parity violating  $\beta$ -decay revealing the sought after NMR/NQI nuclear information through the spatial asymmetry of the decay electrons. As a function of substrate temperature, alkali metal coverage and magnetic field the nuclear spin-lattice relaxation measurements show the existence of two distinctly different diffusion barriers on the surface, valued at 0.45 eV and 0.15 eV. The former is attributed to jumps from step to terrace sites, whereas the latter is the barrier between adjacent terrace sites. On the substrate Si(111)7x7 the relaxation measurements suggest a much higher diffusion barrier around 0.8 eV.

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