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Low energy electron scattering from atoms: Search for nanocatalysts[1] A.Z. MSEZANE, Z. FELFLI, Clark Atlanta University, D. SOKOLOVSKI, Queen's University of Belfast — Manipulating the structure and the dynamics of metallic nanoparticles, attractive due to their optical, electronic and magnetic properties, including applications in catalysis, requires a fundamental understanding of the dynamic processes at the atomic level. The fundamental mechanism of catalysis at the atomic scale has already been proposed and demonstrated in Au, Pd and Au-Pd catalysis of H_2O_2 through the scrutiny of low energy electron elastic total cross sections (TCSs) [1]. The use of mixed precious metal catalysts can produce even higher activities compared to Au alone [2]. Here the interplay between negative ion resonances and Ramsauer-Townsend minima that characterize low energy electron TCSs for Au is identified as the fundamental signature of nanoscale catalysts. Calculated electron elastic TCSs for Ag, Pt, Pd, Ru and Y atoms are presented as illustrations. The recent complex angular momentum methodology is used for the calculations [3]. It is concluded that these atoms are suitable candidates for nanocatalysts individually or in combinations.

[1] A.Z. Msezane *et al*, J. Phys. B **43**, 201001 (2010); EurophysicsNews **6**, 11 (2010)
[2] D.T. Thompson, Nano Today **2**, 40 (2007)
[3] D. Sokolovski *et al*, Phys. Rev. A **76**, 012705 (2007)

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