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NLTE abundances of Mn and Co in the Sun

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We present the results of a NLTE analysis of manganese and cobalt lines with well-defined profiles in the solar spectrum. The method of spectrum synthesis is employed, which is based on a model atmosphere with initially specified element abundances. We use the experimental oscillator strengths and hyperfine splitting, specially measured for the project. The influence of NLTE effects on the line formation and element abundances is investigated. The main finding is that both manganese and cobalt are prone to NLTE effects even in the solar photosphere. The abundance of cobalt under NLTE is 0.1 dex higher than that calculated under LTE assumption. The former value is in agreement with the cobalt abundance in CI chondrites within the respective uncertainty of both values. The ionization balance Co I/Co II is satisfied only under NLTE assumption. However, there is large discrepancy between the abundance of manganese in the solar photosphere and in meteorites, which is even larger when deviations from LTE are taken into account. We propose the revised abundances of Mn and Co of 5.37 $\pm$ 0.05 dex and 4.84 $\pm$ 0.02 dex. The reasons for the remaining discrepancies between the solar and meteoritic abundances are discussed.