The work deals with guanine quadruplexes, i.e., non-canonical four-stranded structures of nucleic acids rich in repetitive guanine sequences with potential biological and nanotechnological significance. The first part summarizes basic information about the structure and topology of quadruplexes, in the second part, the present knowledge about the quadruplexes *in vivo* are overviewed. The third part is devoted to experimental methods used in the present study, namely Raman spectroscopy, circular dichroism, and absorption spectroscopy. The next sections are devoted to the acquisition and treatment of your own experimental results. Five sequentially related oligonucleotides differing in the bases in a single-member loop were investigated. The effect of concentration of oligonucleotide and potassium ions K^+ on the stability of these quadruplexes was investigated by Raman spectroscopy, and an unusually high thermal stability was observed. Other experiments included measurements of CDs and absorption spectra at lower oligonucleotide concentrations, two different potassium ion concentrations, and a comparison of the stability of individual modifications with the previously published results. Furthermore, the possible interaction with the cationic porphyrin CuTMPyP4, similar to the interaction with the antiparallel TBA quadruplex, was studied. However, interaction with parallel quadruplexes has not been proven, on the contrary, the effect of the concentration of K^+ ions on the quadruplex stability has been confirmed. Furthermore, spontaneous formation of regular microcrystals from quadruplexes of one of the oligonucleotides studied here was observed and the first Raman spectra of the crystalline quadruplex were measured using a Raman microscope.