Structure of MgO(MgSiO$_3$)$_n$ in Earth’s Lower Mantle: ab initio calculations PATRIC OULEVEY, MOHAMMED SAHNOUN, Department of Chemistry, University of Fribourg, CH-1700 Fribourg, Switzerland, SIMONPIETRO DI PIERRO, Laboratoire de Sciences de la Terre, UMR CNRS 5570, Ecole Normale Supérieure de Lyon, France, BERNARD GROBÉTY, Department of Mineralogy, University of Fribourg, CH-1700 Fribourg, Switzerland, CLAUDE DAUL, Department of Chemistry, University of Fribourg, CH-1700 Fribourg, Switzerland — Ruddlesden-Popper (RP) compounds are composed of alternating perovskite-type and rocksalt-type structural elements. MgSiO$_3$ and MgO are found as separate phases in Earth’s lower mantle. Both structural elements occur also in the hypothetical RP-series MgO(MgSiO$_3$)$_n$. It is interesting to explore the high pressure-high temperature stability of such RP-structures. Using the augmented plane wave implementation of Density Functional Theory we investigate the structural stability at lower mantle conditions of the member with $n = 1$ e.g. Mg$_2$SiO$_4$. The goal of the present calculations is to test the stability of this Ruddlesden-Popper phase relative to $\gamma$-(Mg,Fe)$_2$SiO$_4$ and the assemblage MgSiO$_3$-perovskite + MgO magnesiowüstite. We will present our results of this study.