

PP02: EXPERIMENTAL AND COMPUTATIONAL STUDY OF RECIPROCAL INTERACTIONS OF O-NITRILE ELASTOMER AND ALTERNATIVE AVIATION FUEL CHEMICAL CONSTITUENTS

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Abstract. Currently, several processes are being explored for production of the Synthetic Paraffinic Kerosene (SPK) allowing the production of aviation fuel from feedstocks other than crude oil as well as the sand and oil shale. These processes produce a fuel of mainly of normal and iso Paraffins and do not have the spread of hydrocarbons seen in conventional aviation fuel. Despite a number of advantages, one of the most serious concerns of alternative aviation fuels has come from their low aromatic content. This is due to the fact that the ageing seals in the aircraft would face leakage if the concentration of aromatics is too low.

Reciprocal interactions of O-Nitrile elastomer and major hydrocarbon block constituents of alternative aviation fuel were studied experimentally and computationally. For the experimental part, dynamic tests were carried out using a stress relaxation rig under isothermal conditions as well as temperature cycling. In order to try and understand the phenomena better, "Density Functional Theory (DFT)" was used to investigate the molecular interactions of seal constituents and a number of chemical substances representing various classes of major constituents of blend of conventional and alternative aviation fuel including normal, iso, cyclic paraffins together with aromatics.