



TECHNISCHE
UNIVERSITÄT
WIEN

VIENNA
UNIVERSITY OF
TECHNOLOGY

Institute of Materials Science and Technology

Favoritenstraße 9-11
1040 Vienna

o. Univ. Prof. Dipl.-Ing. Dr. techn. Sabine Seidler
Nonmetallic Materials

tel.: +43-1-58801-30860

fax: +43-1-58801-30895

web: <http://info.tuwien.ac.at/E308/>

e-mail: sseidler@mail.zserv.tuwien.ac.at

Doctoral Thesis Review

"Inorganic Filler in Polymer Environment"

presented by

Ing. Tomáš Peprniček

1. Currency of the topic

Nowadays polymer composites are of a great practical and economical relevance and they include a considerable development potential. This fact is based on the adaptability of materials properties on the technical demands in modern materials due to their heterogeneity. The presented work deals with a special kind of composites, so called nanocomposites in which inorganic fillers with dimensions on the nanometre scale are incorporated in an organic matrix material (polymer). Such materials are of a great interest in modern materials science due to their interesting possibilities in properties improvement of functional and engineering polymer composites. Hence, supported by the governments, investigations in nanocomposites show a strong increase in both the industrial and academic area since app. 10 years. For engineering applications, beside mechanical properties like strength, Young's modulus and toughness, long time behaviour, thermal stability and processability are in the centre of interest. The given work deals with some of these aspects in terms of montmorillonite-filled PVC and PP. In detail the thesis are focused on:

1. processing conditions in correlation to the intercalation or exfoliation state of the nanoclay
2. thermal stability, valuated by dynamic and static thermogravimetric experiments and
3. mechanical properties, determined by dynamic mechanical analysis and conventional tensile tests.

2. Evaluation of the scientific content

The work starts with an introduction in four different papers (just published, accepted or submitted). This introduction gives a short overview about layered silicates and their application in polymers with the corresponding state of the art in the kinds, structure and modification of nanoclays as well as structure formation in polymer layered silicate nanocomposites. Chapter 2 is characterized by a clear structure, but the title "Theoretical background" is slightly misleading.

Chapter 3 gives a short summary of the included papers. All papers are introduced with their aims and results, strong divided from each other. This chapter is followed by the four papers: