

Review of Ph.D. thesis of Ing. Miroslav Pastorek with title “Crosslinking and Ageing Of Ethylene-vinyl Silane Copolymers”

The topic of this thesis is very interesting and many laboratories all over the world study crosslinking of saturated polymers. The industrial importance of this topic is enormous. Crosslinking improves mechanical properties at elevated temperatures. Therefore cheaper polyolefins could sometimes replace more expensive engineering thermoplastics.

The whole thesis consists of 86 pages. In the 26 pages of introduction student well explained the background of the research. Experimental part on 8 pages describes used materials, mixing of EVTMS copolymer with the Ambicat catalyst, sample preparation and finally characterization methods (FTIR, DSC, XRD, measurement of mechanical properties and DMA).

In the “Results and Discussion” section the chemical reactions are monitored with the help of FTIR with the focus on various peaks (e.g. Si-O-Si, -OH, Si-O-C, C-O, C=O etc.). DSC was used to observe the change in melting and crystallization behavior. XRD revealed the change in crystallinity. Mechanical properties were also greatly influenced. DMA is very powerful to show differences especially at elevated temperatures (at low temperatures the curves seem very similar).

Conclusion on 2 pages summarizes most important results. In the end 100 references are listed.

I have three questions.

- 1) Who invented silane crosslinking of polyethylene? When?
- 2) Crosslinking of polyethylene is used during foam production. Why?
- 3) How can you evaluate scission/crosslinking ratio?

Altogether this research was performed on high level with great number of experiments. Student has shown the ability to study literature, perform experiments, analyze experiments and summarize them into well-arranged form.

This doctoral thesis does not contain visible flaws and therefore I recommend it for defense.

I have checked the Web of Science and found 5 papers and 9 conferences with his name. He has already 16 citations (without self-citation), h-index is 2. In my opinion this is enough for granting of Ph.D. title.

On the basis of above mentioned facts I recommend Miroslav Pastorek to obtain a Ph.D. title.

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