**Curriculum Vitae**

**Zhixin Guo**

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**EDUCATION:**

* **Sept. 2016 – Present: Beijing University of Chemical Technology (member university of Project 211)**

PhD, Chemistry

Advisor: Shouke Yan （Distinguished Young Scholar）

* **Sept. 2012 – Jun. 2016: Beijing University of Chemical Technology (member university of Project 211)**

Bachelor’s Degree, Polymer Materials and Engineering **(GPA: 3.39/4.00)**

**INTERNSHIP EXPERENCE**

* **Beijing University of Chemical Technology, Beijing , China** Sept.2018-Present

*Teaching assistant*

Responsible for teaching freshmen advanced mathematics, helping them with questions. After class I answered their questions online and corrected their homework.

* **Beijing University of Chemical Technology, Beijing , China**  Sept.2017-Present

*Research assistant*

Responsible for laboratory, especially for TEM and AFM. At the same time, I was responsible for taking part of the test work within the group and external testing. So I am familiar with the management and operation of TEM and AFM. As a doctoral candidate, I also trained new students, especially in TEM and AFM, when they just entered the lab.

* **UT Southwestern medical research center, Dallas, USA**  Jan. 2019- Feb. 2019

*Internship web-developer*

Learning knowledge of HTML/CSS, at the same time developing a new website for an assistant professor who is working in the Quantitative Biomedical Research Center. My love for programming started at this time, especially when I finished the integrated website.

* **Easy Education co., ltd, Beijing, China**  Sept. 2017- Jan. 2018

*Internship teacher*

Checking the class video very carefully in order to find any mistakes in this video, including programming bugs or the lecturer's error. We also set questions for high school students.

* **IFLYTEK** **co., ltd, Beijing/Heifei, China** Jul. 2016- Sept. 2016

*Operation specialist*

Working with customers, supporting their work, help them with raw data collation and upload. These data were related to education.

**RESEARCH:**

* **Epitaxial crystallization of iPMMA on oriented PE(published)**

Through fixing the orientation of oriented polyethylene (PE) thin film during melt-recrystallization with the help of a vacuum evaporated thin carbon layer, the isothermal melt- and cold-crystallization of isotactic poly(methyl methacrylate) (iPMMA) on oriented PE substrate was studied. The results show that the same parallel chain epitaxy of iPMMA on the oriented PE substrate takes place in both cold- and melt-crystallization processes based on a two-dimensional lattice matching. However, the crystallization kinetics in the two processes are quite different. The induction time of iPMMA during melt-crystallization is significantly longer than during cold crystallization (11 h vs 2.5 h). This is related to the different nucleation mechanism for cold- and melt-crystallization processes. Moreover, the crystal growth rate of iPMMA from melt is much higher than from a glassy solid state. This is associated with a higher molecular chain mobility of iPMMA in supercooled melt than in the frozen amorphous solid film.

* **Explored the epitaxial crystallization of iPS on oriented iPP and multiple melting phenomena of oriented iPS crystal by TEM and in-suit AFM**

IPS have a low crystallization rate and low degree of crystallization. So cold epitaxial crystallization was conducted and a parallel structure was obtained. This is quite different from many polymers that have a cross-hatch structure when crystallized on the surface of oriented iPP thin film. This can be demonstrated by TEM electron diffraction and bright field. According to the in-suit FTIR spectrum, we find iPP has a strong ability to induce the formation of Form-I. This can be explained by two dimensional lattice matching. This mechanism can also explain previous experimental results by other scholars.

* **The mechanism of the direct formation of polybutene-1 trigonal crystal on isotactic polypropylene**

PB-1 melting epitaxial crystallization on oriented iPP and oriented blended PB-1/iPP melt-crystallization was studied and compared. In these two circumstances PB-1 can always form the trigonal crystal on the interface between PB-1 and iPP based on lattice matching. However during the oriented blended PB-1/iPP thin films melt-crystallization, the structure of PB-1 trigonal crystal is more perfect because of the existence of more interface inducing an effect. This means that the formation of form I’ crystal of PB-1 is caused by epitaxial crystallization when α-iPP exists.

* **Conducted experiment to explore the melting process of oriented ultrathin PE film**

AFM to investigate the melting behavior of oriented PE thin film. When treating oriented PE thin films at 135 oC with different time, the morphology of oriented PE thin film is quite different. With time increasing, a spherulitic structure would appear. When melting time is between 15-30min, a unique structure of PE thin films would appear. The melting is always along the oriented molecular direction.

* **Investigate the mechanism of Cross-Nucleation in Poly(butylene adipate), α-PBA crystal on β-PBA crystal and β-PBA crystal on α-PBA crystal**

Using AFM and POM to investigate the cross-nucleation of PBA. When using a different temperature profile, α-PBA crystal can crystal on β-PBA crystal or β-PBA crystal can crystal on α-PBA crystal. AFM investigation figured out the lamella structure at the boundary of different crystallization.

**PERSONAL SKILLS:**

* **Experimental skills:**

Expert in the controlling structure of polymer materials, preparing high oriented polymer thin films.

Independently operated scientific instruments, like TEM, AFM, FTIR, DSC, XRD, POM and so on.

Especially for **TEM**, I’m familiar with **bright filed**, **dark filed**, **electron diffraction**, **high resolution TEM** and understand the **theory of TEM.**

* **Computer skills:** Specializes in the use of computers. F**amiliar with web-development and HTML/CSS.** Proficient in Microsoft Windows such us Microsoft Word, PowerPoint, Excel, and other data analysis software for my experiments, such as DigitalMicrograph, OPUS and so on.
* **Language Skills (English):** Fluent communication. Proficient in writing papers.

**PUBLICATIONS**

* **Guo Z**, Li S, Liu X, Zhang J, Li H, Sun X, Ren Z, **Yan S**. Epitaxial Crystallization of Isotactic Poly(methyl methacrylate) from Different States on Highly Oriented Polyethylene Thin Film. ***J. Phys. Chem. B* 2018**, 122, 9425−9433
* **Guo Z**, **Yan S**. Epitaxial Crystallization of Isotactic Poly(methyl methacrylate) from Melt States on Highly Oriented Polyethylene Thin Film. ***The 13th International Symposium on Polymer Physics proceedings***, 2018.
* **Guo Z**, **Yan S.** Epitaxial melt crystallization of Isotactic Poly(Methyl methacrylate) on Highly Oriented Polyethylene. ***Polymer Annual Symposium proceedings*** 2017
* **Guo Z**,Chenyuhe Yuan, **Yan S.** Epitaxial Crystallization of Isotactic Polystyrene on Oriented Isotactic Polypropylene. To be submitted.
* **Guo Z**, **Yan S.** Direct Formation of Form I Poly(1-butene) Oriented Crystals from Melt Crystallization by Epitaxial. To be submitted.

**CONFERENCES**

* PSE. Dec. 2018. Beijing, China Poster
* The 13th International Symposium on Polymer Physics. Jun. 2018. Xi’an, China Poster
* Seminar on polymer crystallization theory, application and characterization, May 2018. Guangzhou, China
* Polymer Annual Symposium. Oct. 2017. Chengdu, China Poster

**RELATED COURSEWORK:**

* **Undergraduate courses**

General Physics, Fundamental Chemistry, Organic Chemistry, Physical Chemistry, Polymer Chemistry, Polymer Physics, Application of Microscopy on Polymer Crystallization, Photo-electronic Functional Polymer

* **PhD courses**

Structure and Property of Materials, Experimental Methods in Polymer Science, Advanced Polymer Science, Surface and Interface of Materials

**REFERENCES:**

* **Shouke Yan**, PhD

Professor

Beijing University of Chemical Technology

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