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Advanced Materials Research Institute

Science Bridges China Research Profile

Name: **Professor Wu Daming**

Position:

Institute/division: **School of Mechanical and Electrical Engineering**

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SUMMARY OF MY RELEVANT RESEARCH AREAS:

Precision Extrusion technology aimed at providing solusion for preparation of high precise medical plastics tubes with multi-layer and multi lumina structure, including CAE of extrusion die, parallel pressure stabilizer, intelligent control system.

多层、多腔精密医用导管生产技术，包括模具的 **CAE** 模拟设计、并联式稳压系统、智能式控制系统等，提供成套技术和装备解决方案。

Primary Research interests:

Professor Wu Daming is Director of Institute of Plastics Machinery and Engineering (IPME) which was founded in 1993 by Professor Zhu Fuhua, a famous scientist in China in the field of polymer processing. Under the leadership of prof. Zhu, the institute had made remarkable achievements in the aspect of personnel training, team building, scientific innovation and technical delivers, laying a solid foundation for the development of IPME. Currently, IPME has a total of 20 faculty members including 5 professors, 9 associate professors. In the past 18 years, the IPME has successfully conducted over 200 research projects; most of them are National Science Foundation Projects, National Key Research Projects, and cooperative research projects with brand name companies domestic and abroad. More than 30 government prizes have been awarded to the IPME for successful research and great contribution to the development of national economy. The IPME has a nation-wide reputation for research and technical service and deliver in the fields of plastic processing.

The main research fields of IPME include the principle of polymer processing, the technology and equipment of polymer processing, precision processing and micro-processing equipment. The IPME has established extensive academic and technical cooperative relations with relative institutions and enterprises of many countries and regions, including USA, UK, Japan, Canada, Russia, Ukraine, Netherlands, Israel, Australia, Hong Kong and Taiwan.

Main research projects include:

- Mini extruder with diameter of 12 mm, used for medical tubes
- Injection molding machine for preparation of polymer products with micro structure
- Extrusion line for medical pipes

Topics in which you would like to develop collaborative research:

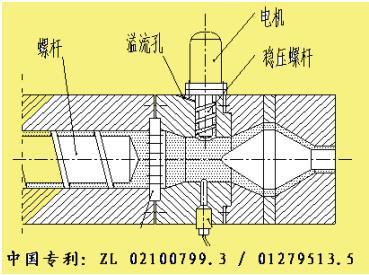
- **CAE of precision extrusion process**
- **CAE of micro injection molding**
- **CAE of injection- press molding process**
- **Micromolding of medical elements (micro needle, micro fluidic chip, etc.**

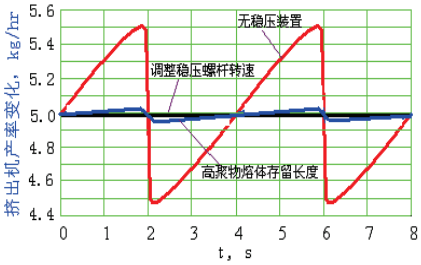
Relevant existing collaborations (academic/clinical/commercial) inside or outside China.

- Technology delivery of whole equipment and technology to Hangzhou Dayuan Medical Packaging Materials Plant
- Technology delivery of whole equipment and technology to Beijing Plastic Precision Extrusion Co. Ltd
- Collaborations with Ningbo L.K.Technology Co., Ltd in micro molding machines
- Collaborations with Weifang Kaide Plastic Machinery Co., Ltd in extruders of medical application

Relevant graphics, figures, pictures:

Mini single screw extruder for medical catheter





The Parallel Pressure Stabilizer for precision extrusion process with high stability of melt pressure and low cost compared with gear pump
Patent 02100799, 01279513.5

Small Extrusion Line for medical tubes

Industrial extrusion line of multi-layer medical tube, Province Zhejiang

Publications and other outputs relevant to your interest in this programme (up to 5)

1. Chang-wei Zhu,Ming-shi Song,Gui-xian Hu,Da-ming Wu, Jing Zhao. Dynamic Theory of Die Swell for Entangled Polymeric Liquids in Tube Extrusion: New Set of Equation for the Growth and Ultimate Extrudate Swelling Ratios under the Free States. Chinese journal of Chemical physics. 2007. V20(5):563-581
2. Bian Xu , Daming Wu. A novel method in preparation of micro-pipe. 2005 International Conference on Advanced Fibers and Polymer Materials (ICAFPM 2005), vol.2 - 2005 /01
3. Zhu Changwei, Wu Daming. Simulation of Extrudate Swell for Multi-lumen Precise Medical Catheter. Plastics. 2008. 37（5）： 99-102
4. Zhu Changwei, Wu Daming. Inverse Extrudate Swell for Multi-Lumen Precise Medical Catheter. Plastics. 2009. V38(1):1-4
5. Wenlong Liu, Daming Wu ,Ying Liu,Xiuting Zheng. The research of the extrusion hot embossing process. Advanced Materials Research Vol. 337 (2011) pp 323-327