

New Progress of Natural Rubber Science and Technology: From Raw Material to Rubber Foam and Composites

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I am very pleased to travel almost half of the world to Poland and I am honored to be able to present to such a distinguished audience the exciting results from the activity and research of my team at Kasetsart University (KU) in Thailand. Now, I am the head of RPM and chairman of polymer science and technology (B.Sc. international program) at KU. The RPM has a testing lab accredited to ISO/IEC 17025. We are certified for testing concentrated natural latex, rubber pillows and rubber glove, then we are the first standard's laboratory for testing rubber pillows in Thailand. We tap the natural latex from rubber trees; then, natural latex is transformed into concentrated latex and solid as solid rubber in rubber sheets or rubber blocks. Thailand is the number one producer of natural rubber or NR for almost three decades now. Normally, we can classify rubber products from the type of raw materials. For example, latex raw materials can be used to produce pillows, mattresses, rubber gloves and so on. But solid raw materials can be used to produce tires, automotive parts, etc. If we focus on the supply value of the NR product, rubber tires consume around 60-70% NR depending on the demand that year. Rubber gloves consume around 15-20%, while pillows & mattresses consume around 5%. However, the pillows & mattresses generated around 300 million USD in 2023. That is why, we focus on both rubber foams for pillows & mattresses and rubber composites for tires. I will present recent results about thermodynamics, and the effects of raw materials, methods, surfactant and filler on the structure and properties of rubber foams. For rubber composites, I will discuss the effects of raw materials, fillers, stabilizers, and non-covalent interactions on the structure and properties of rubber composites.