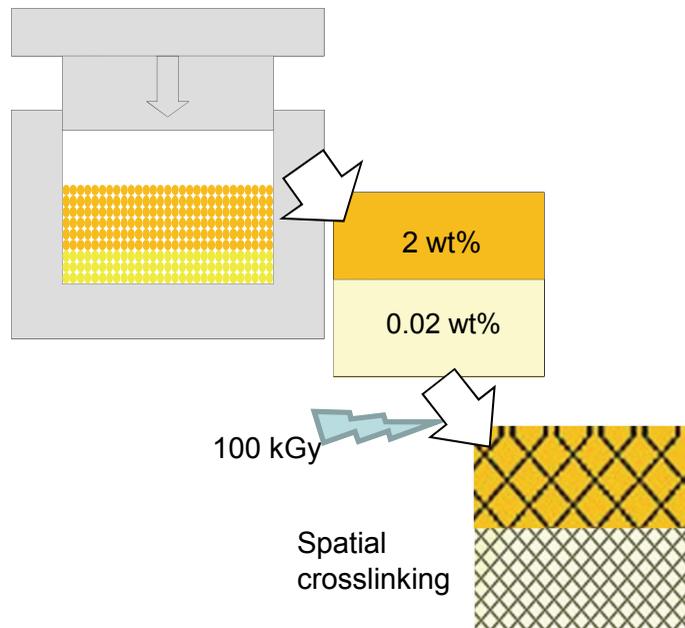


Next generation orthopaedic implants

Summary

Modern polymeric bearing surfaces in orthopaedics are remarkably successful but these materials do not perform well in new tissue sparing procedures where ultra-thin constructs are required. CPG has developed a technology that allows preservation of the wear properties and restoration of the toughness of the material opening the ability to manufacture ultra-thin liners.

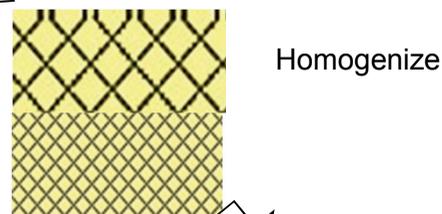


Description

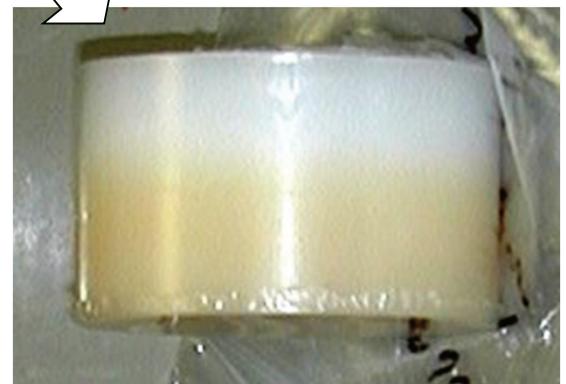
Modern ultra high molecular weight polyethylene has been improved through crosslinking to yield a hard wearing bearing material now capable of surviving for 20 years or more in vivo. However, these highly crosslinked materials have sacrificed toughness for wear and in the modern operating room, where minimal tissue removal is the ideal, this material has finally reached its performance limits. In collaboration with Massachusetts General Hospital, Cambridge Polymer Group has developed a novel method for manufacturing consolidated polyethylene with inhomogenous properties, allowing a hard wearing (crosslinked) surface to be supported by a tough and resilient substrate.

Discussion

The use of antioxidants is receiving considerable interest, none more so than Vitamin E. The primary function of these additives is to provide oxidation protection but they also act to limit some of the crosslinking process during processing. By doping the polyethylene inhomogeneously the crosslinking can be spatially controlled to occur where it is needed most. This process forms hybrid structures during manufacturing and removes sharp interfaces within the material.



Homogenize



Applications

- Ultra-thin liners for tissue sparing technologies
- Tougher interface properties in composite technologies
- Core-shell structure in previously homogeneous materials



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ANALYZE • RESEARCH • CREATE

Cambridge Polymer Group, Inc. is a contract research laboratory specializing in materials. We partner with our clients to solve problems utilizing our multi-disciplinary research team and full service laboratory.

We work with clients throughout the product life cycle to:

- **Develop new materials**
- **Design prototypes for proof-of-concept studies**
- **Create and execute experimental design**
- **Validate and verify manufacturing processes**
- **Perform root-cause analysis in product failures**

Cambridge Polymer Group, Inc. was founded in 1996 to provide a cost-effective resource for testing, research and development to clients who need periodic access to Ph.D.-level scientists and their support structure. We have developed a host of testing methods and materials for our clients, which number more than 300.



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