

FCR 10

Office of the President
December 9, 2008

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period July 1 through September 30, 2008.

Background: The March 4, 1997 meeting of the Board of Trustees authorized the University of Kentucky Research Foundation to conduct all future copyright and patent filings and prosecutions.

Action taken: Approved Disapproved Other _____

PATENT ASSIGNMENT
QUARTERLY FOR THE PERIOD JULY 1 THROUGH SEPTEMBER 30, 2008

Patents

The following assignments on behalf of the Board of Trustees of the University of Kentucky Research Foundation have been executed:

- 1. U.S. Patent Application Serial Number: (to be assigned)**
Filed: April 25, 2008
Title: “Lightweight thermal management material for enhancement of through-thickness thermal conductivity”
Inventor: Dr. Matthew Weisenberger (Center for Applied Energy Research)
Technical Description: The invention relates to thermal management materials and, more particularly, to thermal management materials incorporating aligned carbon nanotubes held in a polymer matrix and methods for producing such materials.
Summary: Aligned carbon nanotubes embedded in a polymer are known for their usefulness in transferring heat. Such a property is useful, for example, in cooling applications, such as in cooling hot pipes. The inventors have developed a new nanotube/polymer material showing improved heat transfer, increasing its usefulness over prior materials for situations where heat transfer is critical.
- 2. U.S. Patent Application Serial Number: (to be assigned)**
Filed: July 23, 2008
Title: “Method and apparatus for characterizing microscale formability of thin sheet materials”
Inventors: Drs. Nasr Shuaib and Marwan Khraisheh (Mechanical Engineering)
Technical Description: The present invention relates generally to a method and apparatus for studying the formability of sheet materials at different strain conditions and, more specifically, to the formability of sheet metals for microscale applications.
Summary: As the demand for microparts and products increases, there is a focus on increasing the efficiency of their manufacture. Currently, the effect on the manufacturing process of reducing the product size is largely determined through trial-and-error methods. The inventors have developed a method of predicting how product size affects the manufacture of microscale products from sheet materials. This method should increase the efficiency of the manufacturing process.
- 3. U.S. Patent Application Serial Number: (to be assigned)**
Filed: June 19, 2008
Title: “Tris-Quaternary ammonium salts and methods for modulating neuronal nicotinic acetylcholine receptors”
Inventors: Drs. Peter Crooks , Linda P Dwoskin, Roger Papke, Guangrong Zheng, Sangeetha Sumithran, Zhenfa Zhang (Pharmaceutical Sciences)

Technical Description: This invention relates to Bis-Quaternary Ammonium Cyclophane Compounds that Interact with nicotinic acetylcholine receptors.

Summary: Neurons affected by nicotine play an important role in the neural circuitry relevant to many neurological diseases, including myasthenia gravis, Parkinsons disease, Alzheimers disease, schizophrenia, eating disorders, and drug addiction. Blocking the activity of neurons sensitive to nicotine is sometimes therapeutic. The inventors have produced compounds that block the activity of nicotine-sensitive neurons. The compounds of this invention should be useful in the treatment of a wide variety of diseases related to the action of nicotine.

4. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: August 1, 2008

Title: “Array platform for micro-RNA analysis and related method”

Inventors: Drs. Guiliang Tang (Plant and Soil Sciences), Xiaoqing Tang, Haining Zhu and Jozsef Gal (Biochemistry), and Wangxia Wang (Sanders-Brown Center on Aging)

Technical Description: This invention relates generally to arrays, methods and kits for detecting mature micro-RNAs (miRNAs) in a sample of interest. In particular, the invention focuses on a method of detecting miRNAs by providing miRNA probes of less than about 18 identical nucleotides.

Summary: miRNAs are recently discovered molecules that regulate gene expression in a cell. Studying these molecules is currently labor intensive and expensive. The inventors have discovered a method of detecting miRNAs that is less labor intensive and less expensive than current methods.

5. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: August 6, 2008

Title: “Semi-synthetic antibodies as recognition elements”

Inventors: Drs. Sylvia Daunert, Leonidas Bachas, Boyd Haley and Smita Joel, (Chemistry)

Technical Description: This invention relates generally to detection of molecules of interest continuously in a living organism.

Summary: There are many applications where the detection of a molecule in a biological sample is useful, such as when detecting pathogens in a sample from a medical patient. Currently, such detection requires isolating a sample from the patient, followed by detection of the pathogen in the sample. The inventors have developed a method of detecting molecules of interest directly in the patient, without the need for isolating a sample first.

6. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: August 6, 2008

Title: “Polypeptides, systems, and methods useful for detecting glucose”

Inventors: Drs. Sylvia Daunert, Kendrick Turner, Smita Joel, and Laura Rowe (Chemistry)

Technical Description: This invention relates generally to the biosensors, and systems and methods of detecting glucose.

Summary: Diabetes is a common disease having widespread and severe health consequences. Management of the disease requires careful monitoring of glucose levels in the patient. Currently, glucose is measured in blood obtained by painful methods, for example, by finger prick. The inventors have developed a method of detecting blood glucose levels within the patient, specifically not requiring the patient to draw a blood sample.

7. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: August 6, 2008

Title: “Device for detection of molecules of interest”

Inventors: Drs. Sylvia Daunert, Leonidas Bachas, Boyd Haley, Smita Joel, Elizabeth Moschou, Kendrick Turner, and Laura Rowe (Chemistry), Ping Wang, Jonathan Siegrist and Marc Madou (Outside Inventors)

Technical Description: This invention relates generally to devices for *in vitro* and/or *in vivo* continuous detection of molecules of interest.

Summary: There are many applications where the detection of a molecule in a biological sample is useful, such as when detecting pathogens in a sample from a medical patient. Currently, such detection requires isolating a sample from the patient, followed by detection of the pathogen in the sample. The inventors have developed a device for detecting molecules of interest directly in the patient, without the need for isolating a sample first. The device is embodied as a catheter with an attached sensor.

8. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: August 11, 2008

Title: “Method for reducing the curing time of a painting composition”

Inventors: Drs. Kozo Saito (Mechanical Engineering), Rodney Andrews (Center for Applied Energy Research), Belal Gharaibeh and Wahed R. Wasel (Mechanical Engineering)

Technical Description: This invention relates generally to the painting field, and more particularly to a method for reducing the curing time of a painting composition.

Summary: The speed of manufacturing processes that include a painting step is severely limited by the time required for the paint to cure. The inventors have developed a method of speeding up the curing rate of paint. Specifically, the

inventors have discovered that including carbon nanotubes in the painting composition and subjecting the painting composition to radio waves shortens the curing time.

9. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: August 12, 2008
Title: “Modified Rubisco large subunit N-methyltransferase useful for targeting molecules to the active-site vicinity of Ribulose-1, 5-Bisphosphate”
Inventor: Dr. Robert L. Houtz (Horticulture)
Technical Description: This invention relates generally to Modified Rubisco Large Subunit N-Methyltransferase and methods of using it to alter plant growth rates.
Summary: Increasing the rate of plant growth is an important goal as a means of increasing crop yields. Ribulose-1,5-bisphosphate carboxylase-oxygenase (Rubisco) is a plant protein that plays an important role in photosynthesis and, consequently, plays an important role in plant growth. The inventor has discovered a modification to Rubisco that increases the rate of plant growth.

10. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: August 15, 2008
Title: “High-activity mutants of butylcholinesterase for cocaine hydrolysis and of generating the same”
Inventors: Drs. Chang-Guo Zhan, Hoon Cho and Hsin-Hsiung Tai (Department of Pharmaceutical Sciences)
Technical Description: The invention relates to butylcholinesterase variant polypeptides and, in particular, to butylcholinesterase mutants having amino acid substitutions.
Summary: Cocaine is a highly addictive substance. Drugs such as cocaine that are resistant to metabolic breakdown are often more addictive than those readily broken down. The inventors have enhanced the ability of the butylcholinesterase enzyme to metabolize cocaine by causing specific mutations in the natural enzyme. The inventors anticipate that this enhanced enzyme can be used to treat cocaine addiction.

11. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: September 10, 2008
Title: “System and methods for diagnosis and monitoring of bacteria-related conditions”
Inventors: Drs. Sylvia Daunert, Sapna Deo, Patrizia Pasini, Anjali Kumari, Harohalili Shashidhar, Deborah Auer Flomenhof, Nilesh Raut (Chemistry)
Technical Description: The invention relates to diagnosing and monitoring conditions of interest. In particular, the invention relates to diagnosing and monitoring bacteria-related conditions.
Summary: It is known that bacteria release chemicals known as “quorum sensing molecules” [QSM], which serve to communicate information about

bacterial concentration. The inventors propose to assess the activity of infectious bacteria in human patients by measuring their level of QSM.

12. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: September 10, 2008
Title: “Spores for the stabilization and on-site application of bacterial whole-cell biosensing systems.”
Inventors: Drs. Sylvia Daunert, Sapna Deo, Patrizia Pasini, Amol Date (Chemistry)
Technical Description: The invention relates to biosensors for detecting analytes of interest. In particular, the invention relates to biosensors comprising spore-forming bacterial cells and/or spores generated from the spore-forming bacterial cells.
Summary: Bacterial cells have been genetically engineered to detect substances in the environment, such as toxins. These bacteria, however, are difficult to store, since they can survive only in a narrow range of environmental conditions. The inventors have genetically engineered spore-forming bacterial cells to detect substances. Spores permit the survival of bacteria in harsh conditions, so the genetically engineered bacteria of this invention can be stored in harsh environmental conditions.

13. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: September 10, 2008
Title: “System and technique for retrieving depth information about a surface by projecting a composite image of modulated light patterns”
Inventors: Dr. Daniel Lau and Chun Guan (Electrical and Computer Engineering)
Technical Description: The invention relates to structured light systems that utilize multipattern techniques, whereby multiple projected structured light patterns are used to reconstruct an image. In particular, the invention relates to a technique and system that employ at least one camera and one projector used in concert for retrieving depth information about at least one surface of an object employing traditional, and new, structured light-pattern projections.
Summary: Extracting depth information from camera images or real-world objects is useful and has both and robotics or military applications. Current methods of extracting depth information from camera images are sensitive to movement of the objects. The inventors have developed a method of extracting depth information that is less sensitive to movement of the object.

14. **U.S. Patent Application Serial Number: (to be assigned)**
Filed: September 16, 2008
Title: “Methods for screening and producing plants with increased saccharification efficiency for biofuel and forage production”
Inventors: Drs. Seth DeBolt, Darby Harris and Jozsef Stork (Horticulture)

Technical Description: The invention relates to methods for selecting and/or producing plants having an increased saccharification efficiency. In particular, the invention relates to methods of selecting and/or producing plants having a reduced relative crystallinity index (RCI) as compared to a wild-type plant, which in turn provides for an increased saccharification efficiency.

Summary: The high price and environmental impact of fossil fuels have spurred the search for suitable alternatives. Ethanol is a promising alternative, being renewable and cleaner. However, ethanol is produced from simple sugars, and most plant material is composed of complex sugar polymers. Converting these complex polymers to simple sugars (saccharification) is expensive. The inventors have genetically engineered plants in which saccharification is more efficient, lowering the cost of producing ethanol from the plants.

15. **U.S. Patent Application Serial Number: (to be assigned)**

Filed: September 18, 2008

Title: "Lock and hold structured light illumination"

Inventors: Dr. Daniel Lau and Charles Casey (Electrical and Computer Engineering)

Technical Description: The invention relates to computer implemented systems, as well as associated techniques, for performing three dimensional imaging of surfaces undergoing animation/motion.

Summary: Current implementations of capturing three-dimensional images use expensive equipment and sacrifice image detail in exchange for capturing the three-dimensional information. The inventors have developed a method of capturing three-dimensional images that uses less expensive equipment and sacrifices less detail.

Patent Activities

Fiscal year to date as of September 30, 2008

Number of Patent Applications	15
Number of Patents Issued	5
Patent Income	\$397,928