

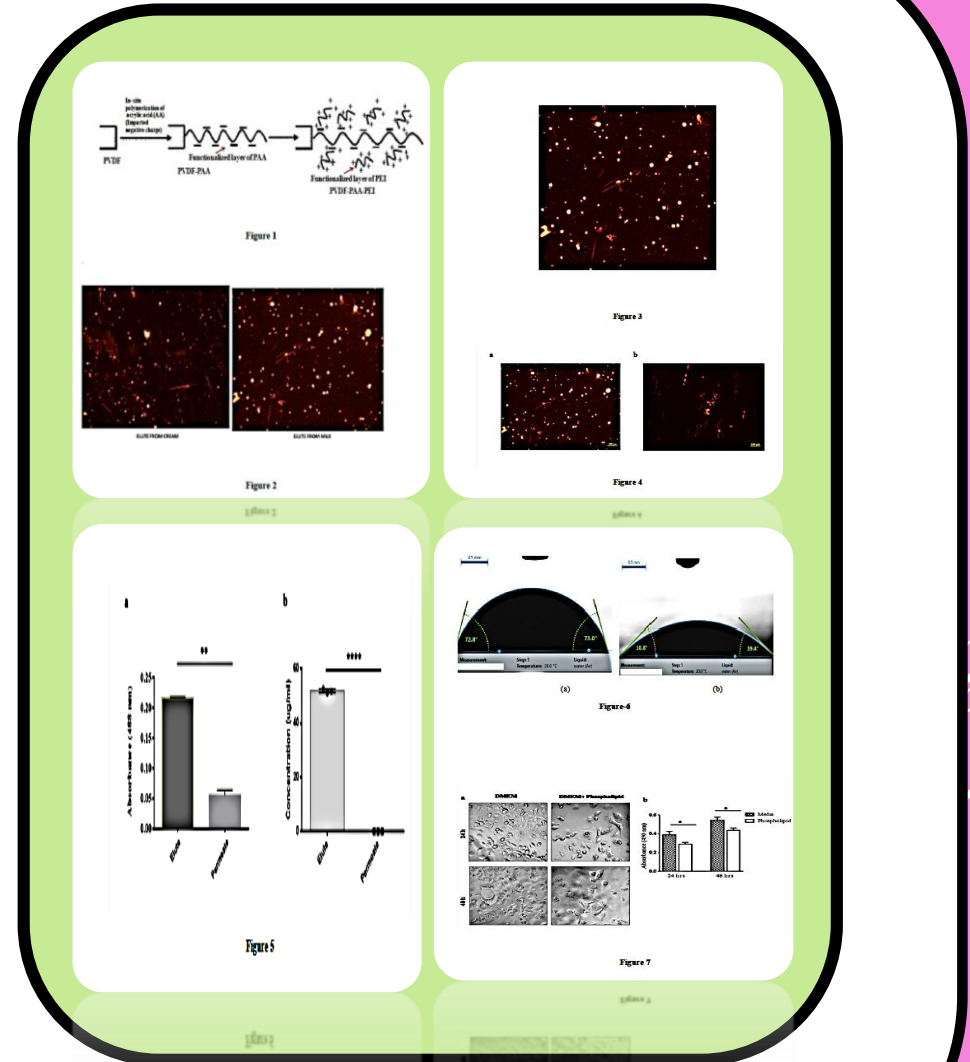
Title: Functionalized membrane-based process for selective isolation and enrichment of milk fat globules (MFGs)

Name of the inventor: Ambatipudi Srinivas Kiran, Saurav Datta and Aparna Verma (BT)

Application number: 201811013231(IN)

Date of Patent Filing: 06.04.2018

Summary: The present invention relates to a functionalized membrane based process that is capable of selective isolation and enrichment of Milk Fat Globules (MFGs) directly from milk with lower processing time and superior quality of product. More particularly, the present invention relates to a functionalized membrane based process that is non-thermal, environment friendly, faster and causes minimal damage to fat globules, thereby retaining their health promoting benefits



Title: *A modified ceramic shell/body and its method thereof for investment casting process*

Name of the inventor: *D. Benny Karunakar and Sanjay Kumar (MIED)*

Application number: *201811029896(IN)*

Date of Patent Filing: *09.08.2018*

Summary: *The present invention provides a modified ceramic shell for investment casting process with an improved porosity/permeability. The conventional ceramic shells are prepared using slurries that are developed by mixing aluminum silicate (as refractory powder) and colloidal silica (as binder). A molochite stucco is applied using rainfall stucco machine between successive slurry coatings. The modified ceramic shell / body (from the present work) and its method thereof includes the following steps. An extremely small amount of iodine is added to the inner coat slurry, which upon heating, got sublimed and left micro pores inside the inner coating of the shell. In a similar way, a small amount of needle coke is added to the outer coat slurry. During the firing of the shell, the coarse needle coke got burnt and, consequently, macro pores are created inside outer coating of the shell, which would enable escape of the undesirable gases that may generate inside the shell during pouring. This ultimately would enhance the porosity/permeability of the ceramic shell and reduce the porosity defects in the final cast parts. The modified ceramic shell also possesses adequate mechanical properties like flexural strength, tensile strength and fair inner surface roughness.*

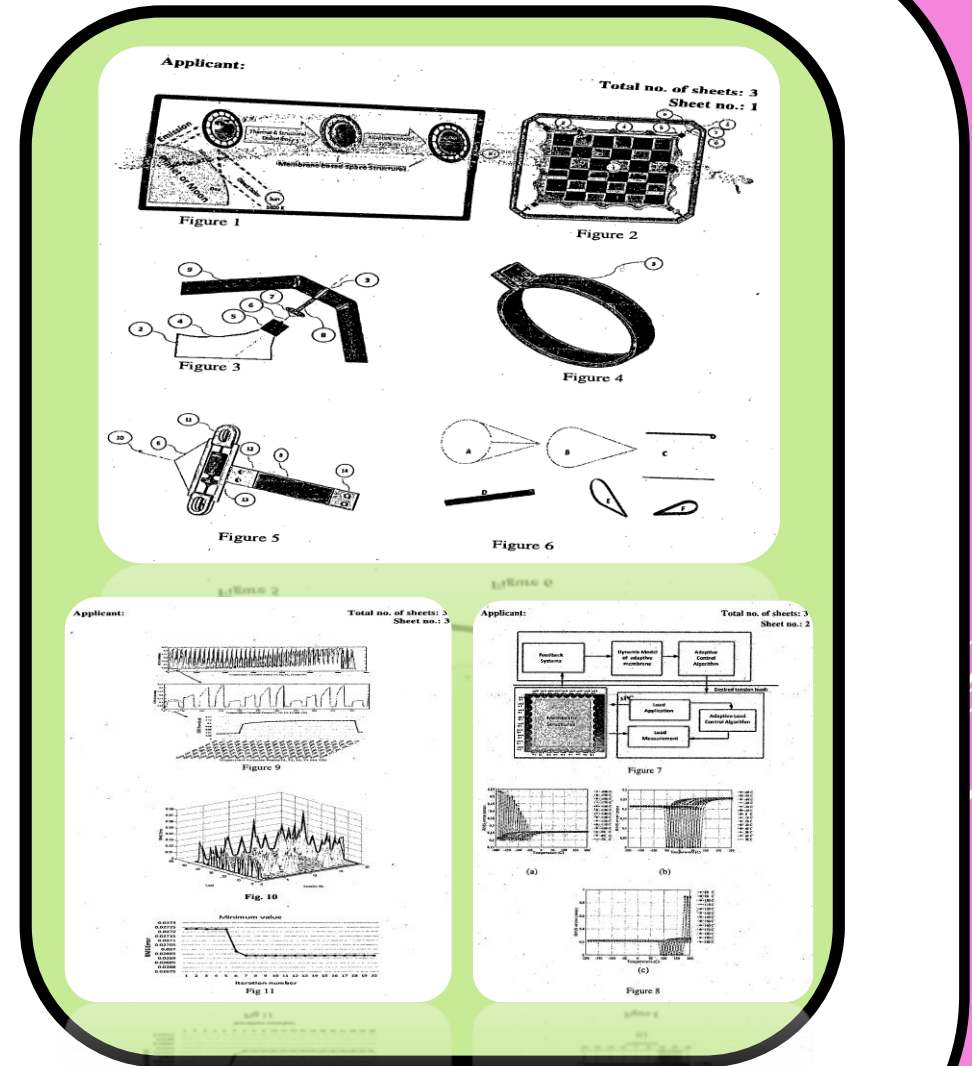
Title: Adaptive shape control mechanism for planar membrane structure

Name of the inventor: Sanjay H Upadhyay, Satish Kumar and Kripa S. Singh (MIED with ISRO)

Application number: 201811037750(IN)

Date of Patent Filing: 05.10.2018

Summary: The present invention provides surface flat planar membrane structures which improves the efficiency of space based membrane reflector, mirror, etc. The present invention more particularly provides adaptive shape control mechanism for planar membrane structure for better surface control of antenna surface and smooth functioning of the communication. The adaptive membrane structures, is stabilized with a random for stabilizing the distortion present in the reflector.



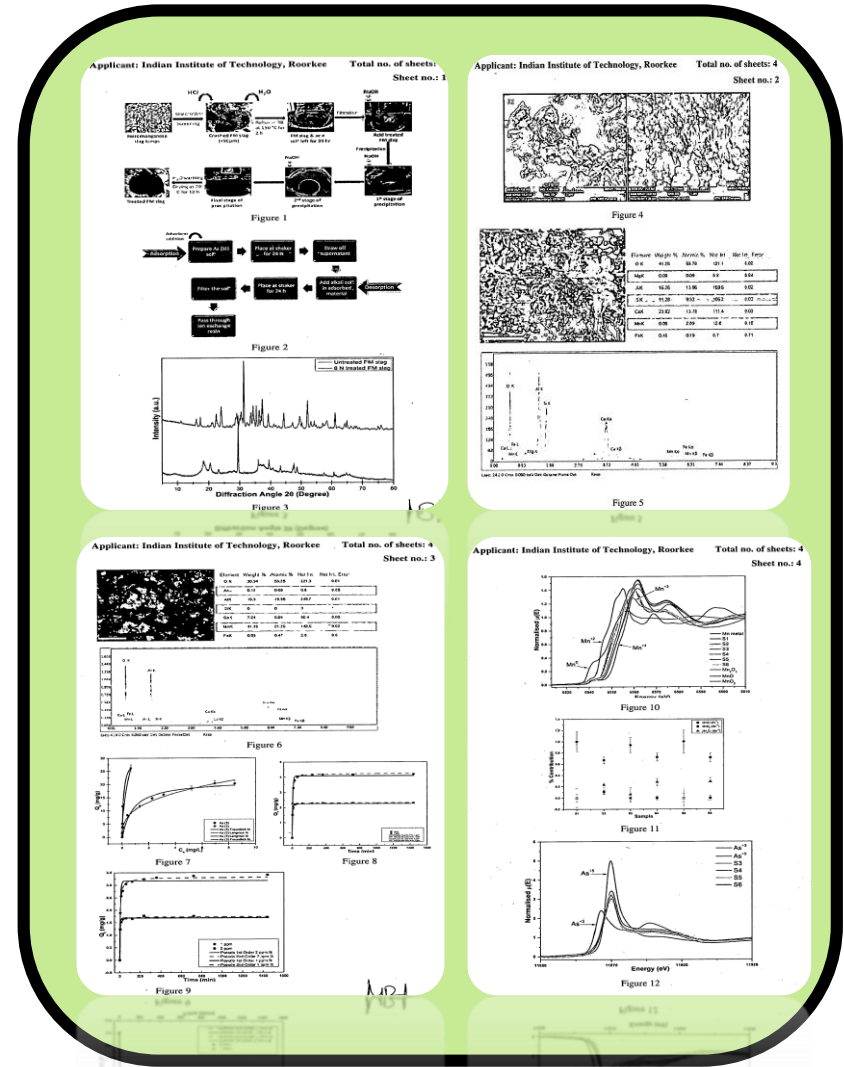
Title: An improved ferromanganese slag to oxidize arsenite and removal of arsenic from water

Name of the inventor: Abhijit Maiti and Nishant Jain (PPE)

Application number: 201811043116(IN)

Date of Patent Filing: 16.11.2018

Summary: The present invention provides modified ferromanganese slag which simultaneously oxidizes arsenite and adsorbs both arsenic species (arsenite and arsenate) from the contaminated water. The adsorbent are prepared by the leaching operation carried on ferromanganese slag with optimized hydrochloric acid concentration followed by filtration, and then precipitation with alkali solution of liquid fraction of acid leached mass. Finally the precipitates are washed and dried. The dried material was crushed to its desired size and used as an arsenic adsorbent for liquid medium.



Title: *A thermal energy storage material using renewable sources and its method of preparation*

Name of the inventor: *Sujay Chattopadhyay and V. J Reddy (PPE)*

Application number: *202011016740(IN)*

Date of Patent Filing: *18.04.2020*

Summary: *The present invention relates to a thermal energy storage material using renewable sources and a method of preparing the capsules of caprylic acid as PCM using chitosan shell through ionic gelation method. The present invention provides the effects of various PCM amounts on the encapsulation efficiencies of caprylic acid using chitosan shell. Chitosan encapsulated PCM capsules are prepared by precipitating chitosan using sodium tripolyphosphate (STPP) bath followed by cross linking reaction of capsules with glutaraldehyde (3wt.%).*

Title: *A three terminal lithium-ion battery-supercapacitor hybrid system consisting of bimaterial electrode*

Name of the inventor: *Anjan Sil, Sobhit Saxena and Hari Raj (MMED)*

Application number: *202011017484(IN)*

Date of Patent Filing: *23.04.2020*

Summary: *The present invention relates to a three-terminal lithium-ion battery supercapacitor hybrid system. The first terminal is connected to a bimaterial electrode, the second terminal is connected to a battery material electrode facing battery material of bimaterial electrode and third terminal is connected to a supercapacitor material electrode facing the supercapacitor material of bimaterial electrode. The supercapacitor materials as well as battery material are fully exposed to electrolyte and no hindrance in the intercalation of the battery material takes place. Both the materials are in contact with each other in bimaterial electrode for successful hybrid action. The hybrid action is achieved by making battery and supercapacitor material in contact.*

Title: *Low cost reinforced bipolar membrane fabricated with interface layer*

Name of the inventor: *Sujay Chattopadhyay and Bhuvanesh E (PPE)*

Application number: *202011020265(IN)*

Date of Patent Filing: *14.05.2020*

Summary: *The present invention provides synthesis of a low cost bipolar membrane having superior performance by functionalization of base polymers of glass transition, $T_g < \text{room temperature}$ and possessing good chemical, mechanical and thermal stability. Catalyst (2, 6) Pyridine dicarboxylic acid also called Dipicolinic acid, (DPA) layer is used for water dissociation. At normal pH (~ 7.0) DPA acts as deprotonated dicarboxylic acids anions ($-\text{COO}^{-1}$) and its presence at interface, water dissociation potential at $100 \text{ mA}\cdot\text{cm}^{-2}$ gets reduced to 2.345 V from 2.65 V, while a commercial (FBM) BPM showed potential of 1.972 V. Application of nylon based woven fabric reduced the overall cost of BPM compared to PEEK based woven fabric as reinforcing material. DPA deposition increased current efficiency (η) of BPM electro dialysis from 59 to 64 % (while the same η with Fumatech BPM is 81% and the energy consumption (E) got reduced from 11.56 to $10.26 \text{ kWh}\cdot\text{kg}^{-1}$.*

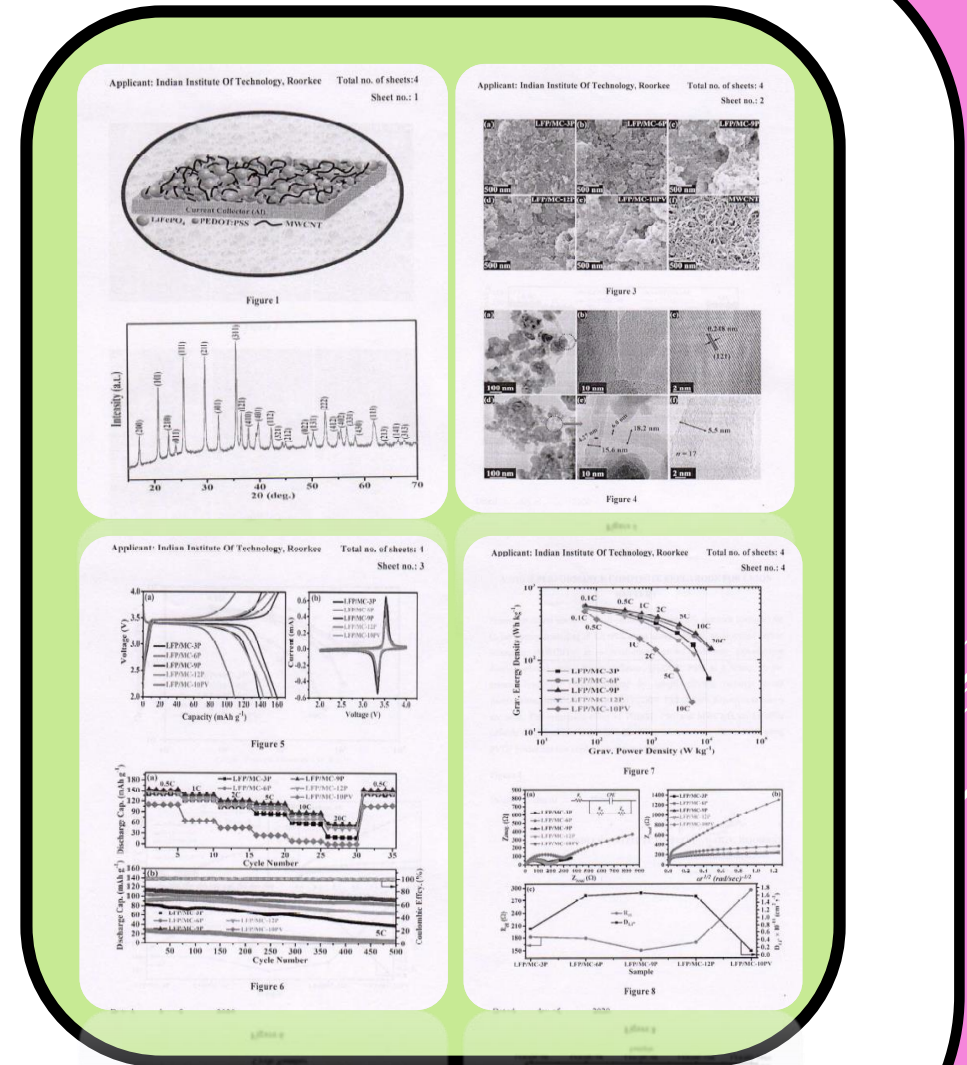
Title: A high performance composite electrode for Li-ion Battery

Name of the inventor: Anjan Sil and Hari Raj (MMED)

Application number: 202011035788(IN)

Date of Patent Filing: 19.08.2020

Summary: Present invention relates to a high-performance composite electrode (cathode) Li-ion battery consisting of LiFePO₄ as an active material, multi-walled carbon nanotubes (MWCNTs) as a conductive additive and poly (3,4-ethylene dioxothiophene): poly (styrene sulfonate) (PEDOT: PSS) as a binder. In the present invention, LiFePO₄ prepared by sol-gel process, carboxyl group functionalized MWCNTs (>90%) and PEDOT: PSS (3 wt.% dispersion in water) are used. The synergistic effect of PEDOT: PSS and MWCNTs on LiFePO₄ cathode of lithium-ion battery is a benefit to overcome the drawback of using PVDF binder and low conductive carbon additive.



Title: Protective ion-conducting flexible electrolyte-cumseparator sheet for solid-state battery having Li/Na metal- anodes and methods for producing the same

Name of the inventor: Yogesh Kumar, Asit Sahoo and Brahma Prakash Dubey (PHY)

Application number: 202011051145(IN)
Date of Patent Filing: 24.11.2020

Summary: Present invention relates to solid-state battery configuration having a flexible electrolyte-cum-separator sheet in which nanostructured high aspect ratio, interconnected ionically-conducting active filler is homogeneously distributed in the polymeric backbone. The developed flexible nanostructured sheet is not limited to use as a separator but can be utilized as solid-electrolyte in all solid-state/ metal batteries. The electrolyte-cum-separator sheet has been developed using optimized molar concentration of polymer and a definite weight % of nanostructured active fillers, which provides a high ion conductivity along with good thermal stability. By optimizing the process and system parameters the thickness and mechanical properties of flexible electrolyte-cum-separator sheet can also be easily tuned. The instant disclosure further includes electrochemical cell configuration where the processing of composite electrodes and its exposure with developed flexible electrolyte-cum-separator sheet are also forth herein.

