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Design and Implementation of Cancer Cells (Tumors) Elimination Using MEMS

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Abstract: In recent days one of the major and common cancer diseases for women is known as breast cancer. In most of the cases, in the external part of the body, the abnormal cells grow forming tumors. Several methods are used to detect and eliminate cancer cells from external part of the body. By using chemotherapy and radio therapy techniques, the normal healthy cells are highly affected by the drugs and the radiation. Now, we propose resistive heating method for cancer cells elimination. The tumors are eliminated due to increasing voltage in a metal plate by using the intellisuite software in MEMS technology. The improvement of fluidic performance in small area and the still growing need for swift and high throughput analysis for pharmaceutical industry and other clinical studies is the need of the hour. The heat flowing in a thin film through the resistive heaters have greater effect compared to the traditionally used Peltier elements and frequently add to efficiency and functionality for thermally, highly sensitive application. In certain metals the resistivity varies with temperature making them suitable for temperature sensors. The thin film material during heating should maintain a consistent temperature circulation, the total resistance reflected in its temperature. The uniform distribution of heat flow in a metal film eliminates the cancer cell tumor.

Key words: Cancer Cell Tumor · Resistive Heating · Metal Film · Intellisuite · Mems

INTRODUCTION

The breast cancer tumor causes major problem for women and it's hard to eliminate a particular tumor. In recent years many methods have been developed to explicitly account breast cancer tumor [1]. In medical diagnosis, detection of a tumor can be done using various tests but all tests fail to explain the structure of a breast cancer tumor. Thermal expansion is a common method used in the micro scale to displace a part of a component, for example in an actuator [2-4]. In this example model the opposite is required; that is, there should be a minimum of thermal expansion. This type of device could be included in a micro gyroscope or any other sensor for acceleration or positioning [5-7]. The new model consists of two major aspects in physics: Former deals with a thermal balance with a heat source in the device originating from Joule heating (ohmic heating). The maximum thermal energy at the tumor site and minimum thermal diffusion and global energy deposition is the result [8].

The models are also being used to investigate aspects of particle delivery, migration and agglomeration, nano particle targeting, molecule bond breaking, effects of perfusion on energy dissipation and diffusion and the non-linear nature of thermally induced cell-death mechanisms [9,10]. Targeting of cancer cell is shown in Figure 1. This will break the bond between the cancer cells.

Structure Design: The stress and strains are well within the elastic region for the material. The expression for thermal expansion requires a strain reference temperature for the copper-beryllium alloy, which in this case is 293 K. In the first part of our study we use breast model to explain clear cut view of tumors. To evaluate modelling accuracy we generate patient specific models. This second part of the study is based on CT data of thermal expansion sensor of breast cancer patients. Thermal expansion sensor is modelled with the required specifications. Temperature variations during respiration

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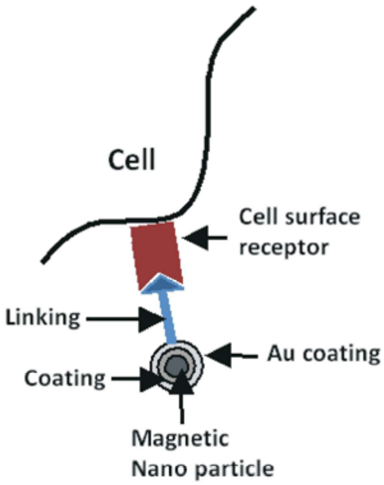


Fig. 1: Targeting Cancer Cells and Method for Elimination of Cancer Cells

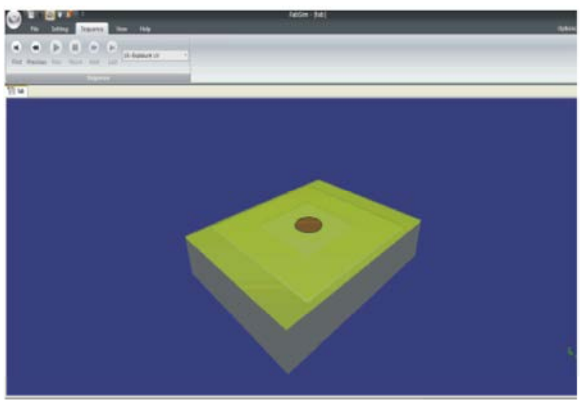


Fig. 2: Final Fabrication

show the presence of tumors. Modelling accuracy is evaluated by simulated patient specific data. Many methods are adopted for cancer detection and its elimination. Here, thermal expansion sensors are used for the detection of carcinoma cancer cells and the resistive heating method is used for eliminating the cancer cells. By using MEMS INTELLISUITE software, the cancer cells will get eliminated. In medical field, this method can be implemented by endoscopic technique.

Heating devices have become quite popular for analyses in fields such as biomedical and bioengineering as well as MEMS in general. Through various techniques they incorporate all the equipment involved in a chemical process such as chemical reactors, heat exchangers, separators and mixers. This example involves the design of a resistive heating method, a device that acts as both heaters as well as sensor equipment which is used to target the cancer cells and the heating method is used to destroy the cancer cells.

Model Definition: The material heats up when an electric current passes through it, due to electric resistance. This is called resistive heating or Joule heating. There is also a coupling working in the opposite direction: the material's electric resistance varies with the temperature, increasing as the material heats up. In the designing of thin resistive film heating, the input design of the system is given in Blueprint. Then the design layout is set into the requirement with the specification and color. In 3D builder we are following the few steps to obtain the thin film resistive heat module. First we initiate the thin film shape and size of each coordinate then deposition, exposure, etching and final fabrication to obtain and optimize the resistive heat thin film model.

Output Results: The 3D output is obtained by using 3D builder and modify the height of each layer as per our requirement to optimize the design.

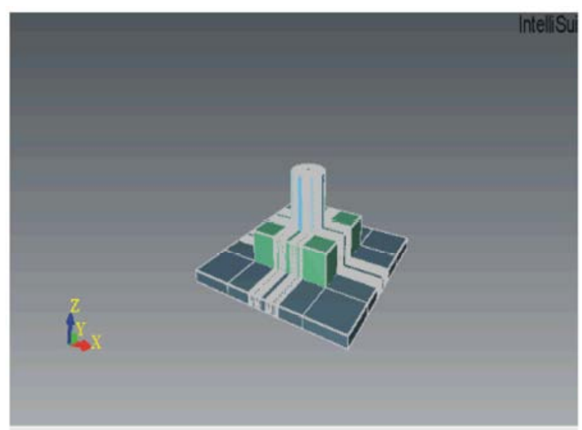


Fig. 3: Enlarged 3d Output For Metal Film.

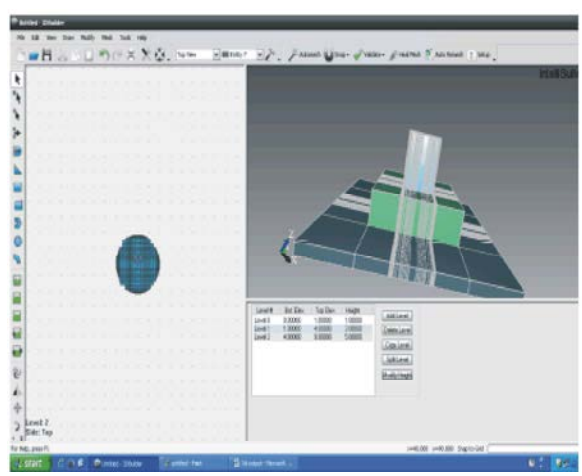
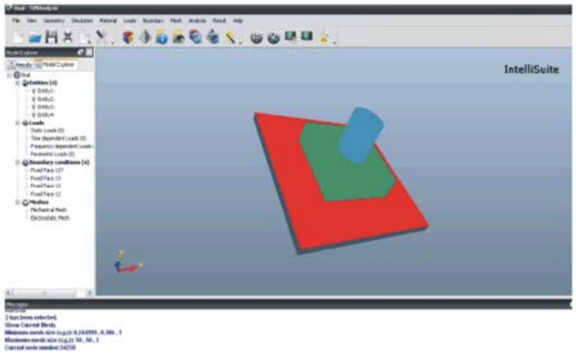


Fig. 4: Simulation Output For Metal Film In 3d Builder



Fig, 5: Final Output For Resistive Heating Metal Film

Table 1: Tabulation for thermal expansion sensor

Temperature (°C)	Bonding Variation(um)
37	0
37.5	0.375
38	0.8
38.5	1.25
39	2
39.5	2.45
40	3

Table 2: Tabulation for Resistive Heating

Time(S)	Specific Heating (*10^3J/g°C)
2	3
4	3.47
7	4.18
10	4.92
15	5.25
20	6.94

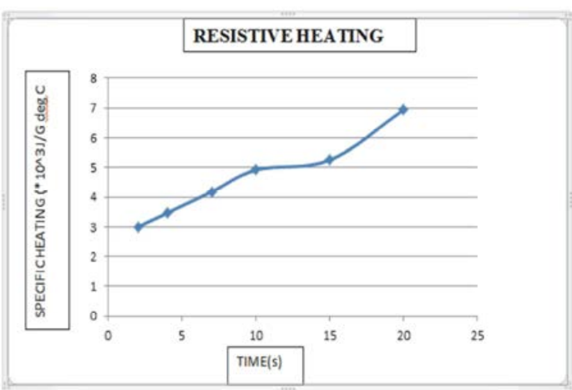


Fig. 6: Output Charactesristics For Resistive Heating

CONCLUSION

The detection of the cancer can be done at the earlier stage and can be eliminated easily. In the common methods like chemotherapy and radiotherapy, there occur side effects for the treatment. But in mentioned method the cancer cell is detected and eliminated without causing much difficulty. To overcome this difficulty we use a sensor to investigate the breast cancer tumor and we propose to use MEMS INTELLISUITE software to model and design thermal expansion sensor which helps to detect tumor in breast and also other part of the body.

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