

# Fabcell: Fabric Element

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## 1 Introduction

Fabcell is a flexible, non-emissive, and multi-color fabric module. In Fabcell, fibers dyed with liquid crystal ink and conductive yarns connected to electronic components are woven into a square textile. By applying voltage to the conductive yarn, and changing the fabric's temperature, the color of fabric surface can be changed. Arranged in matrices, Fabcells display images on the curves of flexible textiles. And used for clothing or with soft objects, it enable them a new expressions of visual imaginary.

## 2 Exposition

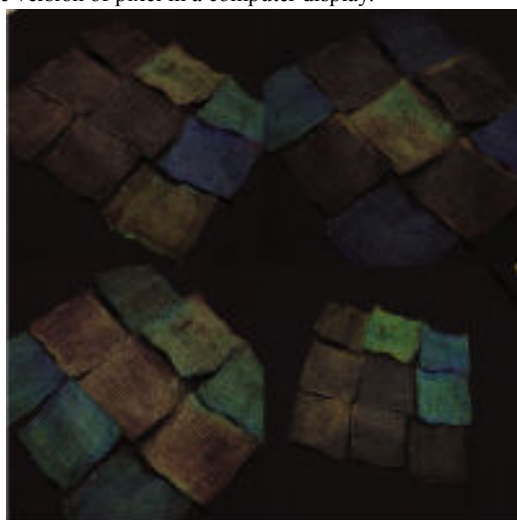
Unlike OLED displays or emissive devices using fiber optics, Fabcells are flexible and non-emissive. It is possible to apply Fabcells to clothing, curtain furniture, or more. In this paper, we will focus on Fabcell display (the display made from Fabcell) and clothing created with Fabcells.

### Technology

*Very Slowly Animating Textiles: Shimmering Flower* was a non-emissive visually dynamic textile display. In this work, using thermochromic ink and conductive yarns, the color of fabrics could be dynamically changed. In Fabcell, it constructed with fibers dyed with cholesteric liquid crystal ink and conductive yarns with electronic components. While in thermochromic ink, the number of colors available is limited; in contrast, the cholesteric liquid crystal ink used by Fabcell can change into a wide variety of colors. To control temperatures used to change the fabric's color, PIC microcontrollers are used. By applying voltage and thereby heating the conduction yarn, the color of textile can be smoothly changed, ranging from red, green, blue to transparent.

### Fabcell display

When Fabcells are arranged in matrices, they become a non-emissive and flexible display. A Fabcell is a fabric element, a textile version of pixel in a computer display.



### The Fabcell system for making clothing with Fabcell modules

The Fabcell system consists of Fabcell modules, a black piece of cloth, and a controller for changing the color of the modules. The face of the piece of cloth has male and female snap-on hooks attached to them in a matrix-style manner. Similarly, in each of Fabcells, several hooks are attached. The wearer can form shapes using the piece of cloth, by attaching Fabcells to it using the hooks. The wearer can also assign the color in each of Fabcells, controlling color by programming microcontrollers. Using Fabcells, one wearer may be able to make skirts that dynamically change color, while another can make shawls of arbitrary, static colors. With the system using Fabcells, the wearer can combine the shape and colors of clothing in his or her taste. The system allows wearers to construct and to reconstruct clothing easily without needlework. Therefore, it is possible to make original clothing even without special knowledge of them.



## 3 Conclusion

Fabcells shift the visual display platform from hard panels to portable textiles, using a fusion of chemistry and electronics. We aim to miniaturize the Fabcell in the future. With higher resolution of Fabcell, images can be downloaded and burned into the fabric. Using Fabcells, clothing or curtain can be changed as if they were display devices, and our living spaces will become more informative and attractive.

## Acknowledgement

The research is supported by the Core Research for Evolutional Science and Technology (CREST) project of the Japan Science and Technology Agency (JST). And special thanks to Taishi Hori, Mariko Higaki, Sohei Kitada, Seitaro Taniguchi, Kayoko Oya.

## References

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