RE-INVENTING BATIK: ZEOLITE ENGINEERED PORE STRUCTURE AS RESOURCE OF CONTEMPORARY BATIK SYSTEM

Yan Yan Sunarya¹, Alvanov Z. Mansoor¹, Dian Widiawati¹, Chandra Tresnadi¹, Fajar Ciptandi², Veinardi Suendo¹, Rino Mukti³

¹Faculty of Art and Design, Institute Technology Bandung, Indonesia
²Creative Industries School, Telkom University, Indonesia
³Faculty of Science, Institute Technology Bandung, Indonesia

yanyan@fsrd.itb.ac.id

ABSTRACT

Batik as one of intangible cultural heritage of the world, has developed in art, science and technology collaboration phase. Batik motifs as well as zeolite molecular structures share similarity in its richness of variants and modules. Those aspects become the potential resource to elaborate new Batik that applies molecular zeolite structures and state of origins. This is an experimental action research of batik and chemist researchers to develop new batik designs and motifs as well as new technology in batik production through multiple disciplines approach in art, craft, and science. This research is conducted through form morphology and adaptation analysis to find its similarity as the benchmarking for contemporary batik zeolit motifs and design development system. The research purpose is to widen the boundaries of cultural and technological collaboration in order to enrich creative economy of Indonesia and never been done before.

Keywords: action research, batik, creative economy, zeolite

INTRODUCTION

Batik has inaugurated as world’s intangible cultural heritage from Indonesia by UNESCO in 2009.[1] This means a challenge for Indonesia to preserve and to extend the existence of batik among Indonesian communities and worldwide. There are many governmental and private institutions who explore to the furthest extention of batik or explore various things to enrich Indonesia’s batik motifs. Some institutions try to expand the distribution channels in new media of rare and near extinction batik, some explore visual elements based on popular icons, and some explore the application of technology and complicated mathematical calculations to formulate new batik compositions. Among various and explorative efforts to extend new frontier of batik, there is an essential question on batik. What is batik, exactly? Is it designing a batik pattern? Is it designing a module? What kind of composition can be called batik? What kind of production process can one be called batik? What is actually the fundamental of batik design?

According to Sewan Susanto,[2] batik is an integrated system between production process on media, visual style or motifs, and exploration of composition which will manifest as fusion of visual style and media. Therefore, the combination between production technology or system with design pattern is a must to create a batik as a creative industry commodity. Production technology and system nowadays is only a matter of replacing the manual production process towards hi-tech production process and substitution of indigenous and natural material such as natural dye towards engineered materials. It is up to design of module and pattern as the only aspects of designing contemporary batik’s visual style. Thus, this is the fundamental idea of this collaborative action research project.
Zeolite is one of chemical fusion of minerals in a form of crystal and can be obtain through two ways, mining from natural resources and engineered on laboratories or chemical factories. The structure of zeolite crystal is a repetition of one or several modules, but the combination of two or three modules may create several different crystal structures. Until 2012, there are more than 200 variances of zeolite crystals.[4] Zeolite crystal pattern has a close resemblance with batik pattern, and this is the fundamental aspect that stimulates this action research. It opens the possibility to design a contemporary batik module and pattern more than just an application of mathematical formula, but elaboration of basic modules which can be applied to press and printed batik as for example. The zeolite structure may work as one or more module for elaborating batik depending on which axis it projected (see figure 1). This research aims to develop a model in form of batik design as the experimentation of two system, zeolite crystal structure system and batik pattern system.

THEORY AND METHOD

This is an experimental action research to develop a model which works as miniature of natural system (zeolite crystal) as initial process. On the later process, it will become the feedback model for macro scale of contemporary new batik design. Based on primary assumption which batik and zeolite has close resemblance in its structural or pattern construction, morphological analysis is selected to create links and starting point of experiments as validation system on conceptual framework of the analysis results.

BATIK DESIGN SYSTEM

In batik design process, the most elaborated phase nowadays is on coloring, finishing, and especially ‘membatik’ process. This process is emphasizing in creating pattern of batik on fabric, whether it is press and print system, manually writing system, or one of the most recent development is through fractal design.[5] This research elaborates the initial phase or the very beginning or the starting point of batik design process, the batik basic module design process.

ZEOLITE BATIK DESIGN METHOD

Zeolite batik design is heavily emphasize on designing the basic module process. From morphological analysis of batik, there is a system of production process on batik design as shown in figure 2. There are four phases in batik design system, basic module design technique, pattern visualization, production with media, and media output. All phases can be engineered through
technology except but one, the basic module design techniques.

Almost all basic modules of batik are symbolization of an event or values. And translation of such basic modules are depicted as adaptation of natural environment or events with several visualization techniques such as adaptation or simplification, tracing, filling, visualization as it is, and many more. Basic module design of batik give opportunity on creating original yet contemporary basic modules of batik zeolite.

**Figure 3:** Scheme of designing re-inventing batik, zeolite engineered pore structure as resource of contemporary batik system.

**DESIGN EXPERIMENTS**

After deciding on basic module design experiment, the second requirement of batik essentials appears which is elaborating values. Elaborating values is not one of ‘membatik’ process, but it is the significance of batik as a cultural content, not just as creative industry commodities. Therefore, the researchers elaborate more on several zeolite crystals origins, market values, its rarity or special structural form it contains. The researchers then come up with MFI zeolite structure as the experiment object (figure 1). The MFI zeolite is one of a few natural zeolite that can be mined in Indonesia.[7] The contemporary batik design process based on MFI zeolite crystal structure is done on several design elements as follows:

a. Line element. Line is one aspect of design elements which always being used in batik design. There are two applications of lines in batik design, graphical line and structural line. Graphical line is used to explore form and shape of batik motif variances, while structural line is used to create certain patterns in a composition of a batik design. In experimenting the MFI zeolite crystal structure, the graphical line is used to express the motif visualization, while structural line is used to surface the repetitive pattern as the invisible boundary among basic modules in the pattern.

**Figure 4:** Design experiment 1 by Fajar Ciptandi elaborated through exploration of line, shape and focal point.

b. Shape element. The unity among several lines and its composition forms several shapes, such as figurative-shape, simplify-shape, naturalistic-shape, and abstract-shape. Based on shape exploration on the MFI zeolite crystal structure, simplify-shapes and figurative-shapes with line element are more preferred because the shapes are still representing the unique structure of MFI zeolite crystal.

c. Color. The experiment of contemporary batik design based on zeolite crystal structures is not restricting the color choices, but the fabric coloring mode, system, and technique are. Therefore, the contemporary batik design experimentation process must adhere to the chosen fabric coloring mode, system, and technique for example: colet, sponge, or air brush coloring techniques will apply certain color chart and combination.

d. Texture. In manufacturing the fabric designed with batik, the texture creation can be formed through weaving process. The weaving texture is best applied through manual weaving process using manually weaving machine.
The visual elements in batik design process are combined through several design composition principles such as harmony, proportion, balance, rhythm, and focal point.

a. Harmony is one of design composition principles which emphasize the synergy of design elements such as combination of various batik basic module scales, combination of lines and shapes, and color combination.

b. Proportion is the relationship among batik basic modules. In batik zeolite experiment, the proportion design principle is explored through the basic batik design module and pattern proportion towards its media or fabric, proportion towards its visual appearance or visual shape’s appeal, and proportion towards its focal point position in media or fabric.

c. Balance is the stability composition of visual elements such as basic batik design module placement in the pattern through clustering system.

d. Rhythm is the flow of basic batik design module placement which will create an organized pattern through repetition of shape, scale of module growth or shrinkage, and flow of perpetuating lines.

e. Focal point or accent is the design composition principle which becomes the center of visual attraction in a composition. The focal point is gained through amplification of color tone in certain cluster, striking lines, or contrast of basic module scale in focal point area.

The MFI crystal structure is projected onto 2 dimensional shapes and explored as the foundation on new contemporary batik design module. Figure 3 is the result of exploration of graphical line and shape exploration of the MFI crystal structure design experiment and combined with original batik design as the focal point through compositing the three modules with application of structural line element. Figure 5, the patterns of MFI crystal structure are connected with modified parang rusak batik motif of batik larangan,[8] to create a more classic, formal, and masculine type of contemporary zeolite batik. The compartments of zeolite basic module are filled with awat, sulur, nitik, and beras wutah isen as symbolization of the abundance of natural zeolite with MFI crystal structure in Indonesia. The colors of sogan from Yogyakarta are applied to emphasize its elegance, fertility, and classic appeal. The design can be produced through writing technique to amplify the originality of repetition to unique concept, or press printing technique to amplify the precision of pattern and applying it in reasonable price.[9] The MFI pattern is also reshaped into more rounded module and repetitive pattern with bright colors in order to give feminine appeal is shown of figure 6.

Figure 5: Design experiment 2, Batik Zeolit combine with ‘Parang Rusak’ motif by Chandra Tresnadi.

Figure 6: Design experiment 3 by Dian Widiawati.

Through elaboration of red to yellow and olive green from traditional truntum batik’s color spectrum,[10] the basic MFI batik module is printed on silk and combined with press print and batik tulis (writing technique) as the finishing process. The design can be applied on semi formal blouse for women as shown on figure 7.
CONCLUSION

Batik as world’s intangible cultural heritage has entered collaborative phase with science and technology. This research is an experimental discourse which is developed among batik researchers and zeolite researchers to formulate a batik design system based on zeolite mineral’s patterns and modules. In the end, the long term research aim is to develop new variants of contemporary batik as result of culture, technology, and science in order to enrich the creative economy products of Indonesia. The innovation in creating zeolite batik, there are 2 paradigms which have to be applied:

a. Extracting and projecting 2 dimensionally the basic module of certain zeolite crystal structure and create a repetition to unique pattern. It can be applied individually or combined with indigenous traditional batik to create more alternatives of patterns and motifs.

b. Extracting the values of simplified zeolite crystal structure in order to set the value of contemporary zeolite batik. Because a pattern will only become a batik when it has values that come along with the pattern.

The zeolite batik experiment proves that innovation on traditional products into a contemporary creative industrial product can be done if the essential values of a cultural products are still applied and transformated. The innovation on traditional products can be achieved technically through communicating it with contemporary elements and shifting paradigms as the foundation.

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