

# The MAM2014 Sample Set

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## Abstract

*Modeling the material appearance of physical materials requires access to the materials. Sets of identical physical material models were prepared for distribution at the workshop on material appearance modeling 2014 (MAM2014). The sample set is intended to facilitate the comparison of measurements and models from different laboratories and psychophysical experiments comparing simulated and physical appearance.*

Categories and Subject Descriptors (according to ACM CCS): I.3.3 [Computer Graphics]: Picture/Image Generation—Digitizing and scanning, Display algorithms

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## 1. Introduction

The Material Appearance Modeling 2014 (MAM2014) sample set includes 16 examples of common materials, shown in Figure 1. They were purchased in hardware, decorating and home improvement stores in the US. They were chosen to include a variety of material types that present different modeling challenges (e.g. transparency, subsurface scattering, high specular, small scale geometry, etc.) The purpose of the set is to give the community access to multiple measurements and models of the same material, in order to be able to compare methods. The ground truth for any material model is visual observation of the real physical material. With these sets, researchers can not only compare models from other research groups, they can assess for themselves the success of models by looking at the physical source materials.

## 2. Practical Considerations

The sample set has been assembled with consideration of the particular needs of computer graphics.

### In what sense are these “identical” samples?

These are not precision samples as would be used to characterize BRDF measurement devices to see if they produce the same measurement for a specific location on the sample and same illumination/observation direction. They are identical in that they were obtained from the same production process and dye lot, produced at the same time (with the ex-

ception of the natural mica samples, which were all taken from the same rock.) The samples are identical materials.

### How can we possibly compare results if the measurements won’t come out as the same numbers?

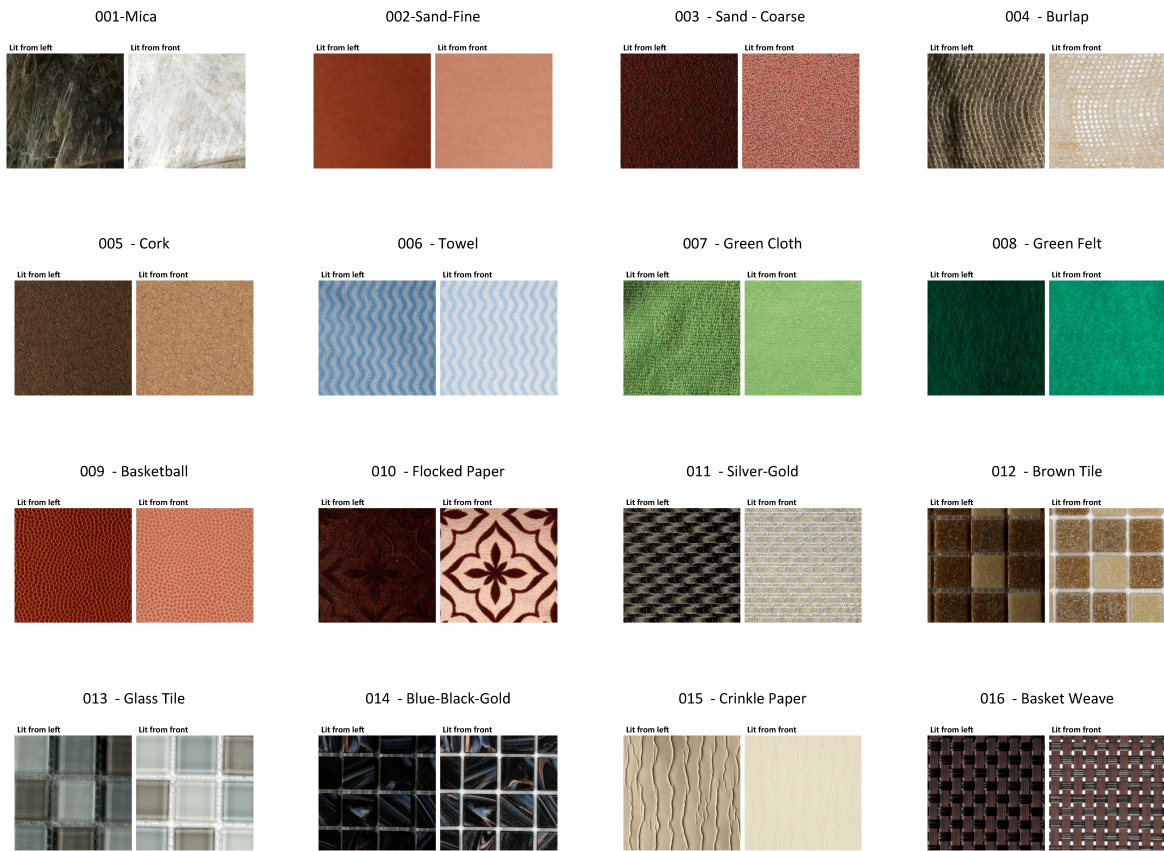
There are natural variations across each individual sample, as well as between samples. This is a characteristic of materials. Determining what characterizes *material appearance* rather than a specific BRDF is what makes material appearance modeling in computer graphics unique and difficult.

### What should researchers do with the sample set?

- Measure and model the set with techniques available at their laboratory, and post results for others. A summary of all data and models will be posted at [graphics.cs.yale.edu](http://graphics.cs.yale.edu).
- Render material models of the same sample available from different labs and run experiments to assess whether the rendered materials appear to be the same stuff.
- Render material models that their laboratory or others have produced and compare them to the physical ground truth in psychophysical experiments.

## 3. Future Sample Sets

The goal is to converge on a definition of what a complete material appearance model is. This sample set is only a first step along the way. Suggestions/proposals for better future sample sets are encouraged. A broader exchange of materials and data is a potential activity for future workshops.



**Figure 1:** Images, with lighting from two different directions, of materials in the sample set.

#### 4. Acknowledgments

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