Abstract: Identification of minerals is a crucial step for the task of rock analysis. The key parameter of identifying minerals is color. However, traditional identification color is only the verbal description, and the quantitative description of color becomes an important process. In addition, the microscope illumination cannot be kept constant during mineral identification. The mineral color will change with the lighting, and the differences in illumination adjustment vary from person to person which affects the accuracy of mineral identification. In this paper, a typical petrographic thin section was photographed under transmitted light by using an optical microscope under plane polarized and cross-polarized light with different illumination, combined with a digital camera. After pre-processing, converting RGB image to HLS color spaces. Then the image feature includes red, green, blue, hue, saturation and Lightness. The enhancement of these features to different minerals is discussed. The hue of the color that determined by wavelength provides a direct measurement the color of the grain. Saturation presents the degree to a pure color. In the hue feature, the variety of mineral colors increases. In saturation feature, the depth of the mineral color becomes obvious, and the more prominent color is filtered out. Therefore, the overall color is bright and clear. In the Lightness, contrast of mineral color is enhanced. Experimental results indicate that brightness has less influence on the HSLcolor spaces, but the RGB image has a greater dependence on brightness. The HSL can assist in quantitatively identifying minerals that can meet application requirements in petrography.

Key words: mineral identification, thin section, RGB, HSL, image processing, quantitative color

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