

Physical and Chemical Properties of Fine Particles (PM_{2.5}) at Background Station of Malaysia

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The morphology of atmospheric particles received significant importance in recent years due to the effect of the particle shape on their radiative and chemical properties. This study focuses on the identification of physical as well as chemical characteristic of fine particle samples collected at background station of Malaysia in Jerantut, Pahang. PM_{2.5} monitoring and sampling were conducted at a latitude N03°58'15.29", longitude E102°20'52.71" and altitude at 77.2 m above sea level, continuously for 24 hours in June, starting from 11th June 2015 until 27th June 2015 using portable beta attenuation monitor (BAM). The average concentration of PM_{2.5} recorded was $33.37 \pm 16.01 \mu\text{g}/\text{m}^3$. It did not exceed USEPA standard ($35 \mu\text{g}/\text{m}^3$) and MAAQS IT-1 ($75 \mu\text{g}/\text{m}^3$), but it did exceed WHO standard ($25 \mu\text{g}/\text{m}^3$). The most abundant particles found in Jerantut were biological particles, identified by their morphological features only. However, there were also influences of anthropogenic sources identified by the particles morphological features and elemental components. Particles from anthropogenic sources consist of agglomeration or short chain of spherulite, flaky, smooth spherical shapes. Biological particles consists of smooth irregular and spherical honeycombs shapes. Major elemental components in anthropogenic particles were Na and Ba. One-way ANOVA together with Duncan's Multiple Range Test was used to analyze anthropogenic sources. From the analysis, the elemental components of anthropogenic sources were classified as industrial, constructions and traffic. Therefore, background station of Malaysia was influenced not only by the biological sources, but also anthropogenic sources that contribute to high concentration of PM_{2.5}.

Keywords: morphology analysis, anthropogenic sources, biological particles