

HEAVY METAL CONTENTS AND MINERALOGY OF BEACH SEDIMENT AT
PENANG ISLAND

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**HEAVY METAL CONTENTS AND MINERALOGY OF BEACH SEDIMENT AT
PENANG ISLAND**

By

Noorkhalisah binti Khamarudin

**Research Report submitted in partial fulfillment of
the requirements for the degree of
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**Department of Marine Science
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UNIVERSITI MALAYSIA TERENGGANU
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TABLE OF CONTENTS

CONTENT	PAGE
ACKNOWLEDGEMENT	ii
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS / SYMBOLS	x
LIST OF APPENDICES	xi
ABSTRAK	xii
ABSTRACT	xiii
CHAPTER 1: INTRODUCTION	
1.1 Research Objectives	4
CHAPTER 2: LITERATURE REVIEW	
2.1 Description of heavy metal on coastal sediment	5
2.2 Marine sediment	5
2.3 Heavy Metal	6
2.4 Metals in sediment	7
2.5 Heavy Metal in Marine Sediment	8
2.5.1 Chromium (Cr)	8
2.5.2 Lead (Pb)	8
2.5.3 Iron (Fe)	8
2.5.4 Manganese (Mn)	9

2.6	Heavy Metal Study	9
2.7	Minerals	10
2.7.1	Sand	11
2.7.2	Silt	11
2.7.3	Clay	12
2.7.4	Quartz	12
2.7.5	Kaolinite	12
2.7.6	Feldspar	13
2.8	Mineralogy Study	13
2.8.1	X-ray Diffraction	13
2.8.2	Scanning Electron Microscope (SEM)	14
2.8.3	Texture Analysis	14
2.9	Textural Triangle	15

CHAPTER 3: MATERIALS AND METHODS

3.1	Study Area	16
3.2	Collection of Samples	19
3.3	Apparatus Precaution	19
3.4	Determination of Heavy Metals	19
3.4.1	Sample Preparation	19
3.4.2	Total Digestion (Teflon Bomb Digestion)	20
3.4.3	Blank Sample Preparation	21
3.4.4	Calculation of Heavy Metals	21

3.5	Mineralogical Analysis	22
3.5.1	X-Ray Diffractometer (XRD)	22
3.5.2	Scanning Electron Microscope (SEM)	22
3.5.3	Hydrometer Method	23

CHAPTER 4: RESULTS

4.1	Heavy Metal Analysis	25
4.1.1	Standard Curve	25
4.1.2	Recovery	27
4.2	Concentration of Heavy Metal at Study Area	27
4.2.1	Lead (Pb)	30
4.2.2	Chromium (Cr)	30
4.2.3	Iron (Fe)	31
4.2.4	Manganese (Mn)	32
4.3	Mineral Composition in Sediment	33
4.3.1	XRD Analysis	33
4.3.2	SEM-EDS Analysis	34
4.4	Percent sand, silt and clay	47
4.5	Sediment Texture	48

CHAPTER 5: DISCUSSION

5.1	Heavy Metal Distribution	49
5.2	Normalization	52

5.3	Mineral composition	56
5.3.1	XRD Analysis	56
5.3.2	SEM-EDS Analysis	57
5.4	Textural Classes	58
CHAPTER 6: CONCLUSION		59
REFERENCES		60
APPENDICES		64
CURRICULUM VITAE		74

LIST OF TABLES

TABLE	PAGE	
3.1	Coordinate of the sampling stations	17
4.1	Metals concentration ($\mu\text{g}\cdot\text{g}^{-1}$ dry weight) and recovery in certified marine sediment (IAEA-356)	27
4.2	Heavy Metal content ranges in the sediment at study area for first and second sampling	27
4.2.1	Concentrations of heavy metals (ppm) in beach marine sediments of Penang Island for first sampling.	28
4.2.2	Concentrations of heavy metals (ppm) in beach marine sediments of Penang Island for second sampling.	29
4.3	Relative abundance of clay minerals in the sediments as identified using the XRD peaks	33
4.4	Elements and element oxides (in wt %) in sediment of station 2A	34
4.5	Elements and element oxides (in wt %) in sediment of station 2B	35
4.6	Elements and element oxides (in wt %) in sediment of station 5A	36
4.7	Elements and element oxides (in wt %) in sediment of station 5B	37
4.8	Elements and element oxides (in wt %) in sediment of station 11A	38
4.9	Elements and element oxides (in wt %) in sediment of station 11B	39
4.10	Ratios of element oxides in sediment of study area	39
4.11	Descriptive statistics of element oxides in sediment of study area	40
4.12	Percentage sand, silt and clay for all station at the study area during first and second sampling	47
4.13	The textural classes for first and second sampling	48
5.1	Concentrations of heavy metals (ppm) in range from first and second sampling of beach marine sediments at Penang Island compared to other countries.	51

LIST OF FIGURES

FIGURE	PAGE
3.1 Map of the study area	18
3.2 Textural Triangle (USDA Classification)	24
4.1 Cr (ppb) standard graph (Intensity vs Cr concentration)	25
4.2 Fe (ppb) standard graph (Intensity vs Fe concentration)	25
4.3 Mn (ppb) standard graph (Intensity vs Mn concentration)	26
4.4 Pb (ppb) standard graph (Intensity vs Pb concentration)	26
4.5 Pb concentration in the study area	30
4.6 Cr concentration in the study area	31
4.7 Fe concentration in the study area	31
4.8 Mn concentration in the study area	32
4.9 Weight percentage distribution of element oxides in the study area (Station 2A)	34
4.10 Weight percentage distribution of element oxides in the study area (Station 2B)	35
4.11 Weight percentage distribution of element oxides in the study area (Station 5A)	36
4.12 Weight percentage distribution of element oxides in the study area (Station 5B)	37
4.13 Weight percentage distribution of element oxides in the study area (Station 11A)	38
4.14 Weight percentage distribution of element oxides in the study area (Station 11B)	39
4.15 Average of weight percentage of element oxides in sediment	40
4.16 Scanning electron micrograph of sediment from station 2A	41

4.17	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 2A	41
4.18	Scanning electron micrograph of sediment from station 2B	42
4.19	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 2B	42
4.20	Scanning electron micrograph of sediment from station 5A	43
4.21	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 5A	43
4.22	Scanning electron micrograph of sediment from station 5B	44
4.23	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 5B	44
4.24	Scanning electron micrograph of sediment from station 11A	45
4.25	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 11A	45
4.26	Scanning electron micrograph of sediment from station 11B	46
4.26	Energy Dispersive X-ray Spectroscopy (EDS) spectrum of clay fraction in station 11B	46
5.1	Normalization curves for Cr, Mn, and Pb for first sampling	54
5.2	Normalization curves for Cr, Mn, and Pb for second sampling	55

LIST OF ABBREVIATIONS/ SYMBOLS

Fe	Iron
Mn	Manganese
Cr	Chromium
Pb	Lead
$\mu\text{g/g}$	Microgram/gram
%	Percent
$^{\circ}\text{C}$	Degree Celcius
HF	Hydrofloric Acid
HNO_3	Nitric Acid
HSO_4	Sulphuric Acid
ppm	Part per million
ppb	Part per billion
H_2O_2	Hydrogen Peroxide
HCl	Hydrochloric Acid
MgCl_2	Magnesium chloride
>	More than
<	Less than
SEM	Scanning Electron Microscope
EDS	Energy Dispersive X-ray Spectrometer
XRD	X-ray Power Diffraction

LIST OF APPENDICES

APPENDIX	PAGE
1 Apparatus and Chemicals Needed in the Study	64
2 Heavy Metal Analysis (Teflon Bomb Digestion)	66
3 Mineralogy analysis (steps for SEM-EDS analysis)	67
4 Mineralogy analysis (steps for Hydrometer method)	68
5 Calculation of hydrometer method	70
6 Statistical analysis using Anova-2 way without replicate between heavy metal concentration and station	71
7 General Identification of the Major Mineral Present (peak)	72
8 Image of sample sediment from SEM analysis	73

Kandungan Logam Berat dan Mineralogi keatas Sedimen Pantai di Pulau Pinang

ABSTRAK

Terdapat dua puluh dua sampel sedimen yang telah diambil dari pantai Pulau Pinang dan dianalisis untuk menentukan kepekatan kandungan logam berat dan mineral serta melihat tekstur sedimennya. Logam seperti Fe, Cr, Mn, dan Pb dianalisis kepekataannya dengan menggunakan teknik penguraian Teflon bom dan dikira dengan menggunakan ICPMS. Statistik analisis untuk semua logam menunjukkan bahawa hubungan diantara stesen adalah berlainan signifikasi dengan nilai $p < 0.05$, dan hubungan diantara tempoh sampling adalah tidak ada perbezaan signifikasi dengan nilai $p > 0.05$. Logam Cr telah dikenalpasti sebagai logam paling banyak berbanding logam yang lain di kawasan kajian tersebut, manakala Mn adalah logam yang paling sedikit. Analisis melalui XRD, image dari SEM, dan tekstur analisis dilakukan untuk memperoleh kandungan mineral dalam sampel sedimen dan juga jenis tekstur sedimen yang terdapat di kawasan kajian. Keputusan menunjukkan bahawa kuarza merupakan mineral yang paling dominan di kawasan kajian, seterusnya diikuti oleh kaolinit, dan paling sedikit ditemui ialah hematit. Analisis hidrometer dilakukan, didapati bahawa tekstur kebanyakan sedimen di kawasan kajian ialah sandy clay loam. Tekstur lain ialah silt loam dan sandy loam. Ini menunjukkan bahawa sedimen di perairan Pulau Pinang adalah agak berpasir. Jenis sedimen yang didapati di kawasan kajian ialah sedimen terrigenous.

Heavy Metal Contents and Mineralogy of Beach Sediment at Penang Island

ABSTRACT

Twenty two sediment samples were collected from beach sediment of Penang Island and analyzed for heavy metals, mineral contents and textural classes of the sediment. Fe, Cr, Mn, and Pb concentration were analyzed by using Teflon bomb digestion and measured by ICPMS. Result on the heavy metal analysis showed that Chromium (Cr) concentration is high in the study area which exceeds the earth's crust value (140 ppm). The statistical analysis revealed that there is a show the relation significant differences ($p < 0.05$), and no significant differences ($p > 0.05$) between sampling periods. Results on the mineral contents showed that quartz is the dominant mineral found in the study area followed by kaolinite and few hematites. Texture analysis shows that the dominant textural class of the sediment is sandy clay loam. Other texture classes found were silt loam and sandy loam. This indicated that the sediments in the study area is quite sandy.