Martin Luther Universität Halle-Wittenberg
Institut für Geowissenschaften
Mineralogie/Geochemie
Prof. Dr. Dr. H. Pöllmann
von-Seckendorff-Platz 3, 06120 Halle,
Tel: +49.345.5526111, Fax:+49.345.5527180,
e-mail: herbert.poellmann@geo.uni-halle.de

Thesis (diploma)

Marc René Domanski

Application of ED-/WDXRF to quantify basaltic rocks

Introduction

The quantitative x-ray fluorescence analysis (ED-/WDXRF) is in comparison to methods of quantitative analysis such as atomic absorption and inductively coupled plasma-atomic emission spectrometry rapid and simple in sample preparation. Furthermore it shows reliable results within a short time. This is due to widespread application in many branches of industry like mining industry, plastic manufacturing and cement production for quality control.

	EDXRF	WDXRF
resolution	600eV- 120 eV (detector independent)	20eV- 5eV (influenced by the crystal & optics design)
source efficiency	>> 90%	<< 1%
spectral overlap	deconvolution method	inexistent
measuring time	< 10min	> 1h
costs	low	high

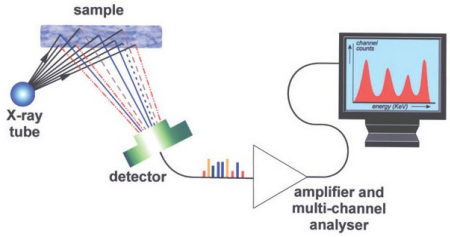

Fig.1 Schematic diagram of EDXRF after Wolska

Objective

The aim of this study is to develop and validate a fast and efficient method for the quantification of basaltic rocks, which essentially correspond to the composition after Tab.1. Measuring methodology for the EDXRF is to be optimised over the direct comparison by ED-/WDXRF.

Si	Al	Fe-total	Mg	Mn	Ca	Na	K	Ti	P
35-55	10-20	10-20	5-10	0-2	8-16	0-5	0-5	0-5	0-2

Tab.2 shows the main elements with selected concentration intervals in % (reffered to the oxides)

In the following Tab. 3 the trace elements (in ppm) are listed, which are used for the preparation of the calibrationsamples.

Ba	Co	Cr	Cu	Cl	Ni	Nb	Sr	V	Y	Zn	Zr
-600	-300	-400	-200	-300	-400	-100	-1200	-300	-200	-300	-400

Literatur:

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