PRESERVATION OF CETEM'S TECHNICAL MEMORY THROUGH THE CREATION OF A DATABASE FOR THE MINERALS, ORES AND ROCKS COLLECTION

PRESERVAÇÃO DA MEMÓRIA TÉCNICA DO CETEM ATRAVÉS DA CRIAÇÃO DE UM BANCO DE DADOS PARA O ACERVO DE MINERAIS, MINÉRIOS E ROCHAS

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Abstract

CETEM's minerals, ores, and rocks collection has been formed over the last 40 years by samples from different regions of Brazil and all over the world, collected by researchers from the Center and/or donated by mining companies. The objective of this work is to create a database to store and classify all the information the samples have. Through a search engine, and QR-Code scanning in the future, the user will have access to the information of a certain specimen. The work methodology consisted, at first, of literature review and checking of old identification records that were inserted into the Excel, after that, the samples not yet cataloged were classified according to what Dana proposed in 1848. The catalog was developed in Microsoft Excel 2010, and through the use of VBA programming language, a form was built to register the samples. Until the present moment, were cataloged 130 specimens that are exhibited in public areas of the CETEM with a customized identification tag.

Keywords:minerals collection, database, VBA.

Resumo

O acervo de minerais, minérios e rochas do CETEM foi formado ao longo dos últimos 40 anos por amostras de diferentes regiões do Brasil e do mundo, coletadas por pesquisadores do Centro e/ou doadas por empresas do setor mineral. O objetivo deste trabalho é criar um banco de dados que armazene e classifique as informações de todas essas amostras. Através de um sistema de busca, e mais futuramente acesso via QR-Code, o usuário poderá ter acesso às informações de determinado exemplar. A metodologia do trabalho consistiu, em sua etapa inicial, de revisão bibliográfica e conferência de antigas fichas de identificação e inserção das mesmas no Excel, depois disso, as amostras ainda não catalogadas foram classificadas de acordo com o proposto por Dana em 1848. O catálogo foi desenvolvido no *software* Microsoft Excel 2010, e com o uso da linguagem de programação VBA, foi construído um formulário para o cadastro de amostras. Até o presente momento, foram catalogados 130 exemplares que estão exibidas em áreas públicas do CETEM com uma etiqueta de identificação personalizada.

Palavras chave:acervo de minerais, banco de dados, VBA.

1. INTRODUCTION

The Center for Mineral Technology's (CETEM in Portuguese) minerals, ores and rocks collectionhas been formed over the last 40 years by samples from different regions of Brazil and all over the world, collected by researchersfromthe Center and/or donated by mining companies. Through sample cataloguing and the creation of a database to store all the information each specimen contains, it will be possible to consult the characteristics of a certain sample through a digital repository.Each specimen will have an identification tag that will contain information like the name, chemical formula, place of origin, and donator. The tags will also have a QR-Code that, when scanned by any mobile phone or tablet with internet access, will take the user to a web page with all the information the sample has.

2. OBJECTIVES

The objective of this work is the preservation of the technical memory of the Center for Mineral Technology through the creationand organization of a database for the Center's collection of minerals, ores and rocks, which will allow the user to access all the information a certain sample has. Beyond that, when visiting the Center, the spectator will be able to see and touch the specimens themselves.

3. METHODOLOGY

The first stage of the work consisted in literature review and checking of old identification records. The samples were cataloged and classified according to what James Dana proposed in 1848 (Klein &Dutrow, 2012; Aquino, 2017) (e.g. silicates, oxides, sulphides, etc.) and received an individual identification code that will return all the specimen's data (i.e. name, chemical formula, crystal habit, hardness, density, occurrence, pictures, place of origin, donator, when applicable, etc.) when inserted intoCETEM's online repository (under construction).Astandard was developed to give the id-code of each sample (Figure 1). This standard takes in consideration the mineralogical characteristics – in the case of minerals or ores –or petrological – in the case of rocks – to give their code.

1. Minerais e Minérios				
1º dígito	2º dígito:	3º e 4º dígitos	5º dígito	6º e 7º dígitos
Tipo:	Min. puro:	Tipo mineral principal:	Sistema cristalino:	Número do espécime:
1 (Mineral)	1. Sim	01. Nesossilicato	1. Isométrico	xx
2 (Minério)*	2. Não	02. Inossilicato	2. Tetragonal	
		03. Sorossilicato	3. Ortorrômbico	
		04. Filossilicato	4. Trigonal	
		05. Ciclossilicato	5. Monoclínico	
		06. Tectossilicato	6. Hexagonal	
		07. Sulfeto	7. Triclínico	
		08. Óxido		
		09. Halóide		
		10. Nitrato		
		11. Borato		
		12. Carbonato		
		13. Sulfato		
		14. Wolframato ou Molibdato		
		15. Fosfato		
		16. Elemento Nativo		
*Ulilizar as características do mineral de minério para dar o código.				

Figure1: Standard created to help the elaboration of the id-codes. The columns indicate the value of each digit according to the characteristics of the specimen, detailed in the rows. For example, a specimen that is formed by a single tectosilicate with a trigonal crystal system would

have the code 11064XX, the first digit stands for the type, which is mineral in this case,the second stands for the “purity” of the sample (two or more minerals are considered “impure”), the third and fourth digits stands for the class of the main mineral (tectosilicate in this case), the fifth digit is related to the crystal system, and the last two (or more) digits represent a sequential number.

The database was built in Microsoft Excel 2010, which separates the specimens into three different sheets – minerals, ores, and rocks – with their own characteristics. Visual Basic® for Applications (VBA) programming language was used to create a form that allows the user to insert data in an easier and quicker way. The identification tags were designed on the free software AssistentePimaco®.

4. RESULTS AND DISCUSSION

A form for sample registration (Figure 2) was developed with VBA programming language inside the own Microsoft Excel 2010 workbook. This form, as mentioned in the section before, optimizes data inputting, and also standardizes the entries and minimizeserrors during this process. After filled and sent, the form inserts the data into the sheet relative to the specimen in question (i.e. mineral, ore or rock).

Figure2: Visual of the form developed to register the samples that will compose the collection.

In total, were cataloged 130 (one hundred and thirty) samples, of which 78 (seventy-eight) are minerals, 24 (twenty-four) are ores, and 28 (twenty-eight) are rocks. The specimens already cataloged, which used to be scattered around public areas of the Center without any kind of organization pattern, are now exhibited in an organized way (Figure 3), and identified with tags that show their names, chemical formulas, place of origin, donator, id-code, and QR-Code. It is important to state that currently the QR-Code takes the spectator to the CETEM’s website, however, after the digital repository is finished, scanning the code will open a web page with all the information about the specimen.

Figure3: Organization of the samples in one of the cabinets located in a corridor of the Mineralogical Characterization Sector.

Figure4: Tag model used in the collection exhibtion. Created in the software AssistentePimaco®.

5. CONCLUSION

The maintenance of a database for minerals, ores and rocks is a meticulous and continuous work, as the registration of a new sample may take a long time when the specimen is new to the cataloger, beyond the fact that surveying and checking old identification records may also take a long time. In addition, another point to be considered is the technological maintenance of the catalog, as the popularization of the media and information technologies forces incessant updating of the tools used in the database.

Although this work is only a prototype of a future digital repository of the Center for Mineral Technology, the execution of it has revealed the importance of organizing and exhibiting mineral specimens, because it is an effective method of scientific divulgation, social inclusion, and democratization of learning. It is also very important to create an interdisciplinary group responsible for the maintenance of the collection, in order to achieve great achievements.

6. ACKNOWLEDGEMENTS

I would like to thank my supervisor, Luiz Carlos Bertolino, for the opportunity and all technical and academical support, I thank the Center for Mineral Techonogy for all the infrastructure that allowed the execution of my work, I thank the Rio de Janeiro State University (UERJ in Portuguese) for my academic formation, and I thank the Ministry

of Science, Technology, Innovations and Communications for the internship offered in association with CIEE-RJ.

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