



迟广成, 李国武, 肖刚, 陈英丽, 伍月, 汪寅夫, 胡建飞. 辽宁瓦房店金伯利岩中石榴石特征及种类鉴定[J]. 岩矿测试, 2013, 32(1): 78~83

辽宁瓦房店金伯利岩中石榴石特征及种类鉴定

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### The Characteristics and Species Identification of Garnets Hosted in the Kimberlites from Wafangdian, Liaoning Province

投稿时间: 2011-10-23 最后修改时间: 2012-03-24

DOI:

中文关键词: [金伯利岩](#) [石榴石](#) [晶胞参数](#) [化学成分](#) [红外图谱](#) [石榴石分类](#)

英文关键词: [kimberlites](#) [garnets](#) [crystal cell parameters](#) [chemical composition](#) [infrared pattern](#) [garnet classification](#)

基金项目: 国土资源部“金刚石矿床标型矿物的X射线衍射特征”项目(200811120)

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中文摘要:

辽宁瓦房店金刚石矿区金伯利岩中的石榴石一直被当作镁铝榴石。为了确定矿区颜色复杂的石榴石种类, 本文对矿区的石榴石进行了系统的采样分析, 测定了112件石榴石样品的晶胞参数、50件样品的微区化学成分和40件样品的红外光谱。利用石榴石晶胞参数、红外光谱、化学成分和化学分子式方法对矿区石榴石进行分类, 结果显示: 晶胞参数分类法误差大, 容易得出错误结论; 红外图谱分类法准确度不高, 只能作为参考方法; 化学成分分类法太过笼统, 达不到详细划分石榴石种类的目的; 化学分子式分类法可把矿区的石榴石详细划分6个矿种: 镁钙铁-铝铬铁榴石、镁铁钙-铝铬铁榴石、镁钙铁-铝榴石、镁钙-铝铬铁镁榴石、镁铁钙-铝榴石、镁铁钙-铝铁铬榴石, 每种石榴石都充分反映了A、B离子的种类及占位特征, 是4种分类方法中最为科学的方法。研究认为瓦房店金刚石矿区金伯利岩中石榴石A端元成分以 $Mg^{2+}$ 离子占位为主; B端元成分以 $Al^{3+}$ 离子占位为主。由于阳离子替代普遍, A、B端元成分复杂, 瓦房店金伯利岩中不存在单纯意义上的镁铝榴石。

英文摘要:

The garnets in the kimberlites of the Wafangdian diamond mining area from Liaoning province have previously been identified as pyrope. In order to define the types of the complicated color garnets in Wafangdian, a systematic sampling and analysis of the garnets in the mining area was taken, including the definition of 112 single mineral crystal cell parameters, the analysis of 50 micro area chemical composition and 40 infrared spectra. The garnets were classified through the following methods: crystal cell parameters, infrared spectrum, chemical composition and chemical formula. The results show that the deviations of the crystal cell parameter classification were large, which may incorrect classification. The results of the infrared spectrum classification were inaccurate, but were only used as a reference method. The chemical composition classification provided general results, which could not classify the garnets in detail. The chemical formula classification classified the garnets into six mineral types: magnesium calcium iron-aluminum chromium iron garnet, magnesium iron calcium-aluminum chromium iron garnet, magnesium calcium iron-aluminum chrome garnet, magnesium calcium-aluminum chromium iron magnesium garnet, magnesium iron calcium-aluminum chromium garnet, magnesium iron calcium-aluminum iron chromium garnet. Each type of garnet reflected A and B ion species and occupation characteristics, which was the most scientific classification method. The results of this research indicate that the A end member ingredient was  $Mg^{2+}$  ion primarily and B was  $Al^{3+}$  ion for the garnets in the kimberlites of the Wafangdian diamond mining area. Due to the common cationic replacement and complex compositions of A and B end members, it was concluded that there is no pyrope in the Wafangdian kimberlites.

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主办单位：中国地质学会岩矿测试专业委员会

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