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论文

龙口褐煤萃取后微晶结构的XRD与HRTEM研究

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摘要:

为了获取褐煤的基本结构单元(BSU)组成信息,采用不同溶剂对龙口褐煤进行分级萃取,借助于X射线衍射仪(XRD)和高分辨透射电镜(HRTEM),对比研究了褐煤大分子骨架结构的排列方式及其萃取前后微晶结构参数的变化特征。研究表明:随着萃取程度的增加,芳香层间距减小,而芳香层片的长度和宽度略有加大,但不同微晶结构,其参数值变化的机理不同;原煤的TEM图像比较清晰,芳香层结构及其排列方式较为均一,随着萃取级数的增加,高像清晰度降低;褐煤的大分子骨架主要以2~3个芳香碳网层片定向排列为主,局部单个层片散布,呈挠曲状、蠕虫状或交叉状;褐煤的超微孔主要是BSU之间的间隙或同一BSU间碳网层的孔隙。

关键词: 龙口褐煤; 分级萃取; 微晶结构参数; 大分子结构排列

Research on the microcrystalline structure of the fractionally extracted Longkou lignite by XRD and HRTEM

Abstract:

In order to know about the composition information of the basic structural units of low metamorphic coals, by means of X ray diffractometer(XRD) and High resolution transmission electron microscopy(HRTEM), the paper contrastively discussed the arrangement mode of macromolecular structure and the change laws of lignite coal, exemplified by Longkou lignite, before and after be fractionally extracted by different solvent.The results reveal that, as the extraction stages increase, the aromatic layer spacing shows a reduction trend, but the length and width of aromatic layer both appear increasing trend.However, these change laws of all the parameters of coal microcrystalline structure are caused by different swelling mechanisms.Comparison by the other extraction residues, the transmission electron microscope images of the raw coal are more clear, and the structure and the arrangement mode of the aromatic layer more uniform.With the increasing of the extraction stages, the clarities of high resolution images of the residues get weak.The macromolecular structure of the lignite is mainly made up of 2-3 carbon net layers with directional arrangement, and single carbon net layer scatters in local area by the mode of deflection shape, wormlike shape or cross shape.The ultra micropores mainly include the spaces in different BSU or the carbon net layers in the same BSU.

Keywords: Longkou lignite; fractional extraction; microcrystalline structure parameters; macromolecular structure arrangement mode

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