Research on the Methods of Controlling Recirculating Air

HU Hanhua[1,2], YU Binbin[1,2]

1.*School of Resources and Safety Engineering, Central South University, Changsha* 410083, *Hunan, China*;

2.*National Research Center of Safety Science and Technology for Metal Mines, Central South University, Changsha* 410083, *Hunan, China*

Abstract: With the increasing of mining depth, the mine ventilation systems become more and more complex, working face location farther away from the main ventilating fan of the earth's surface than they are used to be, the main ventilating fan of the earth's surface can not supply much air to the deep of underground.And it could barely control the deep ventilation.Therefore, it is needed to move the fan into the underground.After the fan is installed in the underground, these could have shorten the distance from the ventilation fan to the working face location.However, these have increase more recirculating air.In order to achieve effective ventilation, ensure the deep of underground could get enough air, the problem of the recirculating air must be effectively controlled. Actually the essence of internal air leakage is the existence of the recirculating air in ventilation system.This paper aims to analyze the formation of recirculating air, propose the evaluation indexes of internal air leakage in ventilation system and develop the software-VentNetLab to get effective control measures.And the evaluation indexes-the efficiency of adjustment could be used to evaluate complexity of mine ventilation adjustment. Multi-level stations ventilation must be used by various mine to achieve effective ventilation.This can carry on the research for the extremely complicated ventilation network, and guidance for rectification mine.

Key words: complex mine; recirculating air; efficient ventilation; empirical study

金属纳米催化剂研究获进展

近日，中国科学院上海应用物理研究所上海光源材料与能源部研究员司锐分别与山东大学教授贾春江课题组、内蒙古大学教授张军课题组合作，利用同步辐射 X 射线吸收精细结构谱（XAFS）表征平台，在镍基和铂基催化剂的活性结构确认方面取得进展，相关论文已发表在美国化学会的《物理化学 C》和《应用材料与界面》杂志上（*J. Phys. Chem. C*, 2016, 120, 7685-7696; *ACS Appl. Mater. Interfaces*, 2016, 8, 18770-18787）。

氨分解（$NH_3 \rightarrow N_2+H$）是氢燃料电池中产生氢的一种有效途径，由于该反应条件苛刻，获取具有高活性与高稳定性的催化剂十分困难。贾春江课题组发展了介孔多元金属氧化物（Ni-Ce-Al-O），同时提高了镍基催化剂氨分解反应的活性与稳定性；司锐课题组通过 XAFS 测试及相关谱图解析，发现了铈的掺杂有助于活性金属镍组分的稳定。铂基电极材料是直接甲醇燃料电池中的关键部分，而如何在长时间工作条件下保持其较高的催化活性，已成为该研究领域的关键科学问题。张军课题组制备了过渡金属氮化物与石墨烯复合的层状介孔材料，将金属铂负载于该基底上，并观察到其电催化活性显著增加；司锐课题组通过 XAFS 测试及相关谱图解析，发现了小尺寸铂纳米颗粒的形成与稳定是铂基催化材料性能提升的关键因素。上述工作结果对于新型镍基和铂基催化剂的设计合成以及相关催化反应机理的探索均具有重要指导意义。

（来源：中国科学院上海应用物理研究所）