PE03

Leaching of some Turkish coals with subcritical water and organic acids

Tayfun Hüyükpınar, E.Sultan Giray*
Chemistry Department, Arts&Science Faculty, Çukurova University, Adana, Turkey
* esgiray@cu.edu.tr

Desulfurization of coal by using supercritical methanol and ethanol are well studied[1-3] In these studies, good results were achieved (30-65% of desulphurization) and it's also found that high temperature and low solvent density are effective on desulphurization. Besides with these, Li reported that supercritical ethanol/water and supercritical ethanol/ KOH mixes also effective on the desulphurization of coals. To the best of our knowledge, leaching coals with sub-critical water didn't report yet.

Effect of sub-critical water and organic acid additives on the leaching of two Turkish coals, Tunçbilek and Soma which have high ash and sulphur content, were investigated. The effects of parameters such as temperature, pressure and various concentrations of organic acids on the removal ash and sulfur from coal was investigated. It was clearly observed that the temperature has a strong effect on the removal of ash and sulfur while the pressure has a small effect. The best removal of sulfur was observed when 1M BF_3 and 1M HCOOH solution used at 250˚C and 70 atm. On the other side the best removal of ash was observed by using 1M BF_3 solution at 250˚C and 70 atm. Depending on the leaching conditions and coal used, reductions ranged from 5 to 36% in sulfur and 5 to 70% in ash content.

KeyWords: Clean coal technologies, subcritical water extraction, demineralization, desulphurization

Acknowledgements

The authors are grateful to the TUBITAK (Scientific and Technical Research Council of Turkey, Project Reference 106M204) and the Cukurova University Research Fund (Project Reference FEF2009YL16) for the financial support.

References

[1] Lee, S., Kesevan, S.K., Ghosh A., Fullerton K.L., **1989**, Selective precombustion desulphurization of Ohio coals using supercritical fluids, *Fuel*, 68, 1210
[2] Li, W., Guo, S., **1996**, Supercritical desulfurization of high rank coal with alcohol/water and alcohol/KOH, *Fuel Process. Technol*, 75, 816.
[3] Meffe S., Perkson A., Trass, O., **1996**, Coal beneficiation and organic sulfur removal, *Fuel*, 75, 25–30.