# 热力发电<sub>第47卷 第5期 总第378期</sub>

CONTENTS

次 Ħ

## 技术经济综述

- 01 火电机组灵活性运行技术综述与展望//牟春华,居文平,黄嘉驷,张建元
- 08 火电机组灵活性改造形势及技术应用//侯玉婷,李晓博,刘 畅,薛建中,周 明,纪江明,杨柏依

### 热能科学研究

- 14 电-热综合能源系统整体能效及灵活性改造方案分析//胡 康,陈 群
- 22 大功率机组一次调频参数优化研究//廖金龙,陈 波,丁 宁,李桓宇,俞自涛,盛德仁
- 29 火电机组与储能系统联合自动发电控制调频技术及应用//牟春华,兀鹏越,孙钢虎,杨沛豪,陈世峰,王 峥,常东锋,居文平,于 洋
- 35 储热罐热分层动态特性分析//曹丽华,丁皓轩,彭培森,姜铁骝,曹兴,赵金峰
- 42 热电联产机组电热煤特性研究//吕 凯, 王红宇, 周 佳, 王东晔, 杨荣祖
- 49 燃气蒸汽联合循环热电联产机组热经济性分析//何 青,罗 宁
- 57 凝结水变负荷深度调峰技术实现方法及其经济性评价//刘 畅, 耿林霄, 高 林, 王 倩
- 63 某电厂汽轮机低压缸零出力供热工况低压末级叶片动强度分析 //谷伟伟, 张永海, 余小兵, 高 庆, 高登攀, 宋文希
- 71 适应深度调峰的广义回热系统热力特性研究//谢 天, 吕 凯, 黄嘉驷, 雒 青
- 77 生物质气化耦合发电提升燃煤机组灵活性分析//王--坤,张广才,王晓旭,邓 磊,周凌宇

# 发电技术论坛

- 83 某超临界 600 MW 机组直流锅炉深度调峰实践//张广才, 周 科, 柳宏刚, 韩 磊, 成汭珅, 聂 鑫
- 89 燃煤机组深度调峰对汽轮机设备的影响//吴瑞康, 华敏, 秦攀, 包劲松, 楼可炜, 丁阳俊, 樊印龙
- 95 火电机组深度调峰热工控制系统改造//高 林, 王 林, 刘 畅, 纪江明, 祁海旺, 周俊波, 侯玉婷, 王明坤
- 101 汽轮机高低旁路联合供热在超临界 350 MW 机组上的应用 //薛朝図,杨荣祖,王 汀,谷伟伟,高 庆,张永海
- 106 300 MW 机组汽轮机低压缸零出力技术//陈建国,谢争先, 付怀仁, 宁 哲, 雷海东, 杨荣祖
- 111 超超临界 1 000 MW 机组零号高压加热器宽负荷回热技术//李 涛,陈 坤,辛志波,张亚夫
- 118 给水泵变频改造扭振安全性分析//杨 昆,赵鹏程,顾煜炯,聂沈斌,何庆琼
- 124 某 600 MW 机组锅炉换热面分级及烟气流场优化//鲁 芬,问树荣,冯润富,周 岩,袁 阳,杨建华,周 飞,张广才
- 131 适应超低负荷运行的汽包水位滤波器//白德龙, 刘鑫屏
- 136 辅机统调动力源变频汽轮发电机组节能分析//安宗武,张亚夫,伍 刚,孙 鹏

[期刊基本参数]CN61-1111/TM\*1972\*m\*A4\*140\*zh\*P\*¥16.00\*3500\*22\*2018-5

#### THERMAL POWER GENERATION

#### CONTENTS

#### Technical and economic review

#### Thermal energy science research

Overall energy efficiency and flexibility retrofit scheme analysis of heat-power integrated energy system
Research on the optimization of primary frequency modulation parameters of high power units
LIAO Jinlong, CHEN Bo, DING Ning, LI Huanyu, YU Zitao, SHENG Deren(22)
AGC frequency modulation technology and application for combination of thermal power unit and energy storage system
MU Chunhua, WU Pengyue, SUN Ganghu, YANG Peihao, CHEN Shifeng, WANG Zheng, CHANG Dongfeng, JU Wenping, YU Yang(29)
Analysis on dynamic characteristics of thermal stratification of thermal storage tank
CAO Lihua, DING Haoxuan, PENG Peisen, JIANG Tieliu, CAO Xing, ZHAO Jinfeng(35)
Study on characteristics of power-heat-coal of cogeneration units
LYU Kai, WANG Hongyu, ZHOU Jia, WANG Dongye, YANG Rongzu(42)
Thermal-economic analysis of combined heat and power generation unit of gas-steam combined cycle
Realization method and economic evaluation of variable load deep peak regulation technology based on condensate water throttling
LIU Chang, GENG Linxiao, GAO Lin, WANG Qian(57)
Dynamic strength analysis of the low pressure last stage blade under zero-output heating conditions of low pressure cylinder in a power plant
GU Weiwei, ZHANG Yonghai, YU Xiaobing, GAO Qing, GAO Dengpan, SONG Wenxi(63)
Study on the thermodynamic characteristics of generalized regenerative system used for deep peak load regulating operation
······XIE Tian, LYU Kai, HUANG Jiasi, LUO Qing(71)
Analysis of flexibility improvement of coal-fired power plant by biomass gasification coupled power generation
WANG Yikun, ZHANG Guangcai, WANG Xiaoxu, DENG Lei, ZHOU Lingyu(77)

#### Power generation technology forum

Practice of deep peak load regulation for a 600 MW supercritical concurrent boiler
ZHANG Guangcai, ZHOU Ke, LIU Honggang, HAN Lei, CHENG Ruishen, NIE Xin(83)
Influence of deep peak load regulation of coal-fired units on turbine equipment
WU Ruikang, HUA Min, QIN Pan, BAO Jinsong, LOU Kewei, DING Yangjun, FAN Yinlong(89)
Thermal control system retrofit for deep peak load regulation of thermal power unit
GAO Lin, WANG Lin, LIU Chang, JI Jiangming, QI Haiwang, ZHOU Junbo, HOU Yuting, WANG Mingkun(95)
Application of turbine HP-LP bypass system combining with heating in supercritical 350 MW unit
XUE Zhaonan, YANG Rongzu, WANG Ting, GU Weiwei, GAO Qing, ZHANG Yonghai(101)
Zero output technology of the low-pressure cylinder of 300 MW unit turbine
······CHEN Jianguo, XIE Zhengxian, FU Huairen, NING Zhe, LEI Haidong, YANG Rongzu(106)
Wide-load regenerative technology of No.0 high-pressure heater in an ultra supercritical 1 000 MW unit
LI Tao, CHEN Kun, XIN Zhibo, ZHANG Yafu(111)
Safety analysis for torsional vibration during variable frequency conversion of feed water pump
······YANG Kun, ZHAO Pengcheng, GU Yujiong, NIE Shenbin, HE Qingqiong(118)
Classification of heat exchanger and optimization of flue gas flow field in a 600 MW coal-fired boiler
LU Fen, WEN Shurong, FENG Runfu, ZHOU Yan, YUAN Yang, YANG Jianhua, ZHOU Fei, ZHANG Guangcai(124)
A filter of drum water level suitable for ultra-low load operation
BAI Delong, LIU Xinping(131)
Energy-saving analysis of variable frequency turbine generator units of auxiliary tracking power system
AN Zongwu, ZHANG Yafu, WU Gang, SUN Peng(136)