

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国际局

(43) 国际公布日
2020年12月3日 (03.12.2020)



(10) 国际公布号
WO 2020/238386 A1

- (51) 国际专利分类号:
G01N 21/3504 (2014.01)
- (21) 国际申请号: PCT/CN2020/082019
- (22) 国际申请日: 2020年3月30日 (30.03.2020)
- (25) 申请语言: 中文
- (26) 公布语言: 中文
- (30) 优先权:
201910456370.9 2019年5月29日 (29.05.2019) CN
- (71) 申请人: 中国科学技术大学 (UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA) [CN/CN]; 中国安徽省合肥市金寨路96号, Anhui 230026 (CN)。
- (72) 发明人: 胡水明 (HU, Shuiming); 中国安徽省合肥市金寨路96号, Anhui 230026 (CN)。 王进 (WANG, Jin); 中国安徽省合肥市金寨路96号, Anhui 230026 (CN)。 孙羽 (SUN, Yu); 中国安徽省合肥市金寨路96号, Anhui 230026 (CN)。
- (74) 代理人: 北京集佳知识产权代理有限公司 (UNITALEN ATTORNEYS AT LAW); 中国北京市朝阳区建国门外大街22号赛特广场7层, Beijing 100004 (CN)。
- (81) 指定国(除另有指明, 要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX,

(54) Title: DETECTION METHOD AND DETECTION DEVICE FOR TRACE GAS

(54) 发明名称: 一种痕量气体的探测方法及探测装置

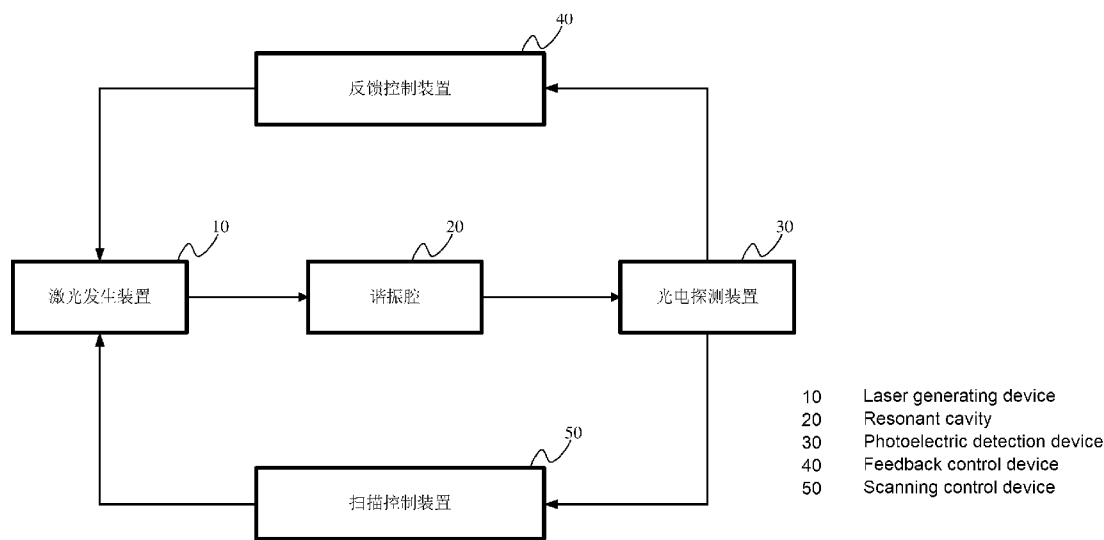


图 3

(57) Abstract: A detection method and detection system for a trace gas, the detection method comprising: providing a resonant cavity (20), a gas to be measured being filled inside of a cavity body of the resonant cavity (20) (S101); providing detection light rays having different frequencies, the detection light rays being incident to the inside of the resonant cavity (20) from one end of the resonant cavity (20) in the extending direction and exiting from the other end of the resonant cavity (20) in the extending direction so as to obtain detection light rays carrying information of a trace gas to be measured, and the cavity body of the resonant cavity (20) having a degree of freedom of expansion and retraction in the extending direction so that the longitudinal mode frequency of the resonant cavity (20) matches the frequencies of the incident detection light rays (S102); and according to the detection light rays that have



WO 2020/238386 A1

MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW。

(84) 指定国(除另有指明, 要求每一种可提供的地区保护): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

本国际公布:

— 包括国际检索报告(条约第21条(3))。

different frequencies and that carry information of said trace gas, acquiring the molecular saturation absorption spectrum of said trace gas, and calculating the concentration of said trace gas (S103). The detection system comprises: a laser generating device (10), the resonant cavity (20), a photoelectric detection device (30), a feedback control device (40) and a scanning control device (50). At room temperature, detection light rays provided by a conventional laser are used to detect the concentration of a trace gas.

(57) 摘要: 一种痕量气体的探测方法及探测系统, 探测方法包括: 提供谐振腔(20), 谐振腔(20)的腔体内部充填待测气体(S101); 提供不同频率的探测光线, 所述探测光线从谐振腔(20)的延伸方向的一端入射到谐振腔(20)内部, 并从谐振腔(20)的延伸方向的另一端出射, 以获得携带待测痕量气体信息的探测光线, 谐振腔(20)的腔体在延伸方向上具有伸缩自由度, 以使谐振腔(20)的纵模频率与入射的探测光线的频率匹配(S102); 根据不同频率的携带待测痕量气体信息的探测光线, 获取所述待测痕量气体的分子饱和吸收光谱, 计算待测痕量气体的浓度(S103)。探测系统包括: 激光发生装置(10)、谐振腔(20)、光电探测装置(30)、反馈控制装置(40)和扫描控制装置(50)。在常温条件下, 利用常规激光器提供的探测光线实现对痕量气体的浓度的探测。