

Title (en)

APPARATUS AND METHOD FOR MONITORING AND REGULATING CRYOGENIC COOLING

Title (de)

VORRICHTUNG UND VERFAHREN ZUM ÜBERWACHEN UND REGELN VON KRYOGENISCHER KÜHLUNG

Title (fr)

APPAREIL ET PROCÉDÉ POUR SURVEILLER ET RÉGULER UN REFROIDISSEMENT CRYOGÉNIQUE

Publication

**EP 2195627 A4 20130731 (EN)**

Application

**EP 08798797 A 20080827**

Priority

- US 2008074465 W 20080827
- US 96847907 P 20070828

Abstract (en)

[origin: WO2009032689A2] An apparatus and method for monitoring and/or controlling cryogenic cooling by measuring the opacity of the vapor cloud (113) generated from a cryogenic cooling device (112). The opacity is determined by measuring the reduction in intensity of a light beam (127) passed through the vapor cloud (113). The opacity measurements are used to control an operating parameter of the system, such as the cooling rate of the cryogenic cooling device (112). The opacity measurements may be normalized to compensate for variables, other than temperature of the workpiece (119) and cooling rate, which may affect the opacity of the vapor cloud (113).

IPC 8 full level

**G01K 13/00** (2006.01); **B21B 37/74** (2006.01); **B23Q 11/10** (2006.01); **G01K 11/00** (2006.01)

CPC (source: EP US)

**F25D 29/001** (2013.01 - EP US); **G01K 11/00** (2013.01 - EP US); **G01N 21/534** (2013.01 - EP US)

Citation (search report)

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- [A] US 2002189413 A1 20021219 - ZURECKI ZBIGNIEW [US], et al
- [A] FR 1564042 A 19690418
- [A] JP 2006337326 A 20061214 - TOYOTA MOTOR CORP, et al
- [A] PIKKULA B M ET AL: "Cryogen spray cooling: Effects of droplet size and spray density on heat removal.", LASERS IN SURGERY AND MEDICINE 2001, vol. 28, no. 2, 2001, pages 103 - 112, XP002699060, ISSN: 0196-8092
- See references of WO 2009032689A2

Citation (examination)

US 4955206 A 19900911 - LANG GARY D [US], et al

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DOCDB simple family (publication)

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