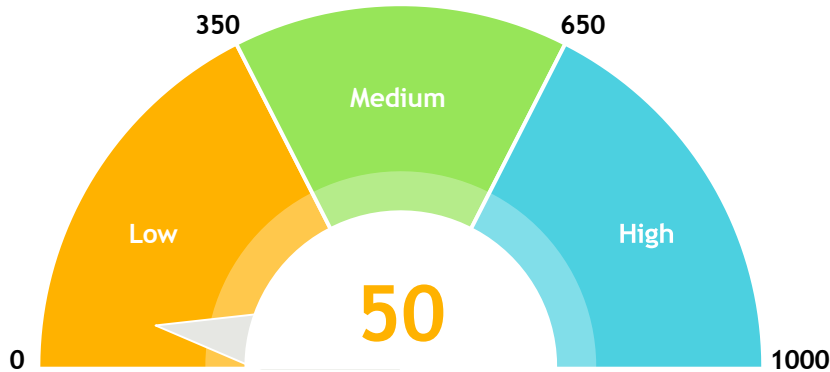


Electric Vehicle Battery

Inside this Report

The Technology Vitality Report is a business ready report that provides powerful insights in evaluating an Invention Description for novelty and market potential. The data presented herein is predictive and uses a variety of statistical modeling, data mining, and machine learning techniques to study prior art allowing users to evaluate submissions prior to publication. This report generally indicates the novelty of the invention and relevant market players regarding the invention's technology.



This Invention Description has low novelty content compared to our collection of patents, applications and non-patent literature. **Invention Novelty** shows whether the technology is a small improvement over competitive technology (low index score) or very dissimilar (high index score) from the technology disclosed in the closest peer.

The Relevant Documents table on the right shows the top relevant documents. See [Closely Related Documents](#) page for more information.

RELEVANT DOCUMENTS

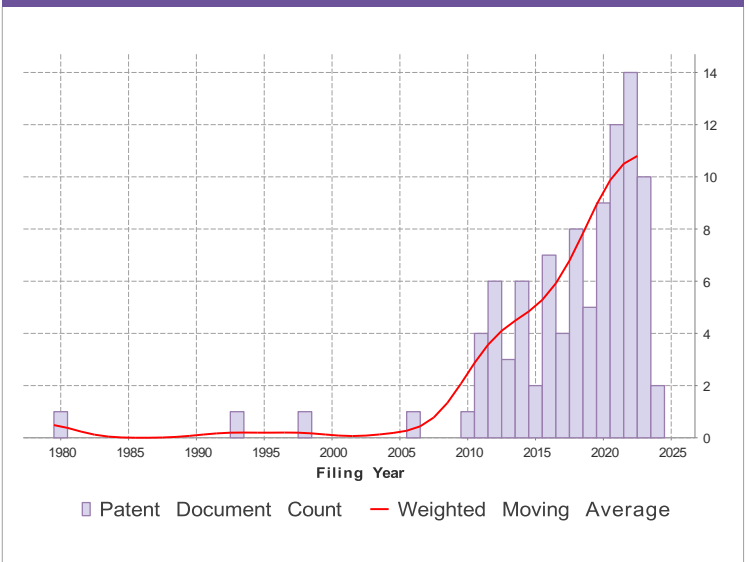
NO. / DATE	TITLE	
IN202111032644A 2021-07-20	Long-lasting solid-state batteries for future electric vehi...	4 <input type="checkbox"/>
US9809123 2017-07-24	Control schemes and intelligent battery selection for elect...	4 <input type="checkbox"/>
US20150244041 2015-05-13	Electric vehicle propulsion system and method utilizing sol...	4 <input type="checkbox"/>
JP2014086209A 2012-10-22	Charge control device for sulfide-based all-solid-state bat...	4 <input type="checkbox"/>
US20130059172 2012-10-10	Electric vehicle propulsion system and method utilizing sol...	4 <input type="checkbox"/>
US10017056 2017-09-10	Electric vehicles with removable homopolar generators for i...	4 <input type="checkbox"/>
IN3493DE2012A 2012-11-09	Electric vehicle propulsion system and method utilizing sol...	4 <input type="checkbox"/>
KR20200047681A 2018-09-07	Solid state rechargeable electrochemical cell	4 <input type="checkbox"/>
US20190081502 2018-01-04	Intelligent circuit control for solar panel systems	4 <input type="checkbox"/>
US20150134172 2014-11-06	Charging system for all-solid-state battery	4 <input type="checkbox"/>

ENTERPRISE PATENT ACTIVITY

#	ULTIMATE PARENT	COUNT
1.	DR B VIKRAM BABU	1
2.	DR G ADILAKSHMI	1
3.	DR GANGANAGUNTA SRINIVAS	1
4.	DR K NEERAJA	1
5.	DR K SRINIVASA RAO	1
6.	DR KARTIK N SHINDE	1
7.	DR KARUMANCHI EPHRAIM BABU	1
8.	DR SRIVASTAVA PRATIMA KUMARI	1
9.	DR TIRUMALASETTY CHIRANJEEVI	1
10.	MR NELLORE MANOJ KUMAR	1

View details on the [Enterprise Patent Activity](#) page.

TOP PATENTS FILING TREND



Invention Novelty

Invention Novelty (InvNov)

50

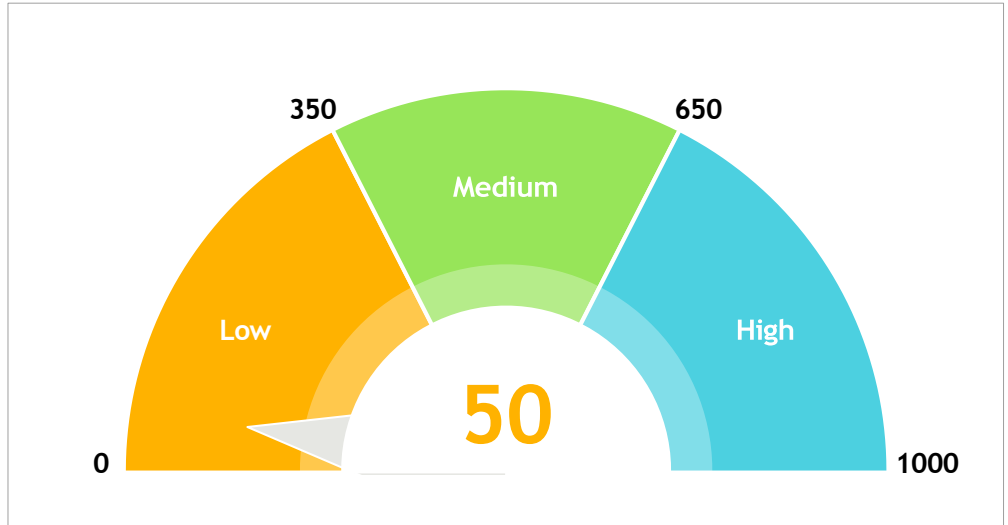
Invention Novelty is based on the uniqueness of the Invention Description when compared to the semantically closest patent, application or non-patent literature in the database. Higher scores indicate greater uniqueness of the underlying ideas. An idea with a low score represents a small improvement over competitive technology. **This Invention Description is related to the closest document.**

Competitive Novelty (CompNov)

N/A

The Competitive Novelty index measures the dissimilarity of the Invention Description from the closest member of the database using a proprietary semantic analysis, not considering those from any of the self-identified entities submitted with the Invention Description.

No entities from the peer group were selected and submitted with the Invention Description.



INVENTION NOVELTY

This Invention Description has low novelty content compared to our collection of patents, applications and non-patent literature. **Invention Novelty** shows whether the technology is a small incremental step (low index score) or a significant leap (high index score) over the technology disclosed in the closest peer.

Low novelty scores might lead the invention's owner to consider defensive publication to help secure freedom-to-operate instead of patenting.

Closely Related Documents

A dynamic Peer Group of related publications is created by applying cognitive semantic retrieval technology to the Invention Description's text. This results in a high-quality set of related patents and non-patent literature that are conceptually linked by their core concepts. Our specialized approach locates documents in non-obvious areas that can contain highly relevant art. In this section are the topmost of the semantically relevant documents up to the [Document Count](#).

NO. / DATE*	TITLE	ASSIGNEE/AUTHOR/INVENTOR	STATUS	<input type="checkbox"/>
IN202111032644A 2021-07-20	Long-lasting solid-state batteries for future electric vehicle system	DR TIRUMALASETTY CHIRANJEEVI	Undetermined	4 <input type="checkbox"/>
US9809123 2017-07-24	Control schemes and intelligent battery selection for electric vehicles	PREMERGY INC	Active	4 <input type="checkbox"/>
US20150244041 2015-05-13	Electric vehicle propulsion system and method utilizing solid-state rechargeable electrochemical cells	SAKTI3 INC	Granted	4 <input type="checkbox"/>
JP2014086209A 2012-10-22	Charge control device for sulfide-based all-solid-state battery	TOYOTA MOTOR CORP	Pending	4 <input type="checkbox"/>
US20130059172 2012-10-10	Electric vehicle propulsion system and method utilizing solid-state rechargeable electrochemical cells	SAKTI3 INC	Granted	4 <input type="checkbox"/>
US10017056 2017-09-10	Electric vehicles with removable homopolar generators for increased driving distances	PREMERGY INC	Active	4 <input type="checkbox"/>
IN3493DE2012A 2012-11-09	Electric vehicle propulsion system and method utilizing solid-state rechargeable electrochemical cells	SAKTI3 INC	Undetermined	4 <input type="checkbox"/>
KR20200047681A 2018-09-07	Solid state rechargeable electrochemical cell	DYSON TECH LTD	Undetermined	4 <input type="checkbox"/>
US20190081502 2018-01-04	Intelligent circuit control for solar panel systems	PREMERGY INC	Granted	4 <input type="checkbox"/>
US20150134172 2014-11-06	Charging system for all-solid-state battery	TOYOTA MOTOR CORP	Granted	4 <input type="checkbox"/>
CN113085698A 2021-05-12	Movable solid-state battery energy storage power supply vehicle	HUANENG CLEAN ENERGY RSCH INST	Pending	4 <input type="checkbox"/>
US9461496 2012-04-02	Method and system for recharging a solid state battery	SAKTI3 INC	Active	4 <input type="checkbox"/>
KR20240085153A 2023-10-17	All-solid-state battery system, vehicle including same, and control method for all-solid-state battery	TOYOTA MOTOR CORP	Undetermined	4 <input type="checkbox"/>
CN214689205U 2021-05-12	Movable solid-state battery energy storage power supply vehicle	HUAQING CHUCHUANG TECH CO LTD	Active	4 <input type="checkbox"/>
JP2024534226A 2022-08-18	Method and system for estimating the state of a solid-state lithium battery based on an electrochemical model	上海屹▲り▼新能源科技有限公司	Pending	4 <input type="checkbox"/>
JP2023060559A 2021-10-18	All-solid-state battery system	TOYOTA MOTOR CORP	Pending	4 <input type="checkbox"/>
WO2023030024A1 2022-08-18	Electrochemical model-based method and system for estimating state of solid-state lithium battery	SHANGHAI FIRM LITHIUM NEW ENERGY TECH CO LTD	Undetermined	4 <input type="checkbox"/>
CN107408721A 2016-02-02	solid-state energy storage device	SAKTI3 INC	Pending	4 <input type="checkbox"/>

Closely Related Documents (Continued)

NO. / DATE*	TITLE	ASSIGNEE/AUTHOR/INVENTOR	STATUS	<input type="checkbox"/>
CN109964356A 2017-08-18	Solid state battery, battery pack, vehicle, accumulating system, electric tool and electronic equipment	MURATA MFG CO LTD	Granted	4 <input type="checkbox"/>
IN202341070197A 2023-10-16	High-capacity solid-state lithium-ion battery with enhanced safety for electric vehicles	DR MUTHUVEL P	Undetermined	4 <input type="checkbox"/>
CN114243133A 2021-05-19	Temperature control method and temperature control system for all-solid-state lithium battery	JIANGSU XINGJIE GUBANG ENERGY TECH CO LTD	Granted	4 <input type="checkbox"/>
US12009478 2023-07-25	Solid state electrolyte	RIVIAN IP HLDG LLC	Active	4 <input type="checkbox"/>
DE112021000875T5 2021-01-08	All solid state battery module, electronic device and method of making an all solid state battery module	MURATA MFG CO LTD	Pending	4 <input type="checkbox"/>
JP2023150126A 2022-03-31	Solid state battery, protection system, and protection method	HONDA MOTOR CO LTD	Pending	4 <input type="checkbox"/>
FR2777395A1 1998-04-09	Traction battery charging system for electric vehicle	MIA ELEC SAS	Granted	4 <input type="checkbox"/>
JP6887088B2 2017-04-04	Stacked all-solid-state battery and its manufacturing method	PANASONIC IP MGMT CO LTD	Active	4 <input type="checkbox"/>
DE102019131127A1 2019-11-18	Solid battery	BAYERISCHE MOTOREN WERKE AG	Pending	4 <input type="checkbox"/>
JP2012257367A 2011-06-08	Controller of battery	TOYOTA MOTOR CORP	Withdrawn	4 <input type="checkbox"/>
CN216903203U 2022-03-07	Battery pack system and vehicle	SHANGHAI JIDU AUTOMOBILE CO LTD	Active	4 <input type="checkbox"/>
CN118281280A 2024-04-01	Battery module, power battery package and vehicle	CHONGQING CHANGAN AUTOMOBILE CO LTD	Pending	4 <input type="checkbox"/>
DE102014103803A1 2014-03-20	Battery state estimator combining a solid state electrochemical concentration model with an equivalent empirical circuit model	GM GLOBAL TECH OPERATIONS LLC	Pending	4 <input type="checkbox"/>
JP7129644B2 2018-04-02	battery modules and vehicles	PANASONIC IP MGMT CO LTD	Active	4 <input type="checkbox"/>
WO2019047967A1 2018-09-11	Solid-state lithium battery, forming method, and vehicle	GREAT WALL MOTOR CO LTD	Undetermined	4 <input type="checkbox"/>
CN220106716U 2023-05-12	Solid-state battery and cooling device and car thereof	SAIC MOTOR CORP LTD	Active	4 <input type="checkbox"/>
WO2020136630A1 2020-02-27	Electric vehicle solid state battery cell	TERAWATT TECH INC	Undetermined	4 <input type="checkbox"/>
DE102020203354A1 2020-03-16	Method for producing an electrolyte for a solid-state battery of a motor vehicle	VOLKSWAGEN AG	Pending	4 <input type="checkbox"/>
US20230275263 2021-07-02	Method for manufacturing a solid-state battery	OERLIKON SURFACE SOLUTIONS AG PFAFFIKON	Pending	4 <input type="checkbox"/>
KR20230001633A 2021-06-29	A System for Charging an Electrical Vehicle Based on Supplying Power Structure Using a Solid State Transformer	ECARPLUG CO LTD	Granted	4 <input type="checkbox"/>

Closely Related Documents (Continued)

NO. / DATE*	TITLE	ASSIGNEE/AUTHOR/INVENTOR	STATUS	<input type="checkbox"/>
KR20160013996A 2014-05-30	Hybrid molten/solid sodium anode for room/intermediate temperature electric vehicle battery	CERAMATEC INC	Granted	4 <input type="checkbox"/>
US4309644 1980-05-05	Electric vehicle controller adapted for charge station connection	REIMERS EBERHART	Expired - Lifetime	4 <input type="checkbox"/>
DE102016109217A1 2016-05-19	Wireless charging system for vehicle	HYUNDAI MOTOR CO	Withdrawn	4 <input type="checkbox"/>
CN111430620A 2020-04-14	Solid-state battery pack	SUNWODA ELEC VEHICLE BATTERY CO LTD	Pending	4 <input type="checkbox"/>
CN116895877A 2023-02-15	All-solid-state battery unit	HONDA MOTOR CO LTD	Pending	4 <input type="checkbox"/>
JP7344724B2 2019-09-06	All-solid-state lithium-ion secondary battery system and charging device for all-solid-state lithium-ion secondary battery	RENAULT SAS	Active	4 <input type="checkbox"/>
US20170338517 2016-12-08	All solid-state battery	HYUNDAI MOTOR CO	Abandoned	4 <input type="checkbox"/>
ITMO20130315A1 2013-11-14	Equipment for recharging batteries of electric or similar vehicles	META SYS SPA	Undetermined	4 <input type="checkbox"/>
JP2022133689A 2021-03-02	Calculation device and all-solid-state battery system	TOYOTA MOTOR CORP	Granted	4 <input type="checkbox"/>
US20230420764 2022-11-28	All-solid-state battery system provided with pressurizing device	HYUNDAI MOTOR CO	Pending	4 <input type="checkbox"/>
KR101637763B1 2014-12-04	Solid-State battery pack assembly, coolant circulating system for vehicle having the same, and Method for manufacturing the same	HYUNDAI MOTOR CO	Active	4 <input type="checkbox"/>
DE102023122730A1 2023-08-24	High-voltage electrical systems that combine solid-state relays with electromechanical contactors for galvanic isolation	GM GLOBAL TECH OPERATIONS LLC	Pending	4 <input type="checkbox"/>
CN107069095A 2016-10-26	Solid state battery and its manufacture method	HYUNDAI MOTOR CO	Granted	4 <input type="checkbox"/>
DE102016224484A1 2016-12-08	Electric vehicle with a traction battery and a range extender and method for its operation	ROBERT BOSCH GMBH	Withdrawn	4 <input type="checkbox"/>
US10449861 2018-12-26	Vehicle battery controller based on a reduced order model	CHONGQING JINKANG POWERTRAIN NEW ENERGY CO LTD	Active	4 <input type="checkbox"/>
CN116895855A 2023-02-13	All-solid-state battery unit	HONDA MOTOR CO LTD	Pending	4 <input type="checkbox"/>
WO2022084263A1 2021-10-18	Backup battery for charging the power supply battery of the motor of a motor vehicle	NTN SNR ROULEMENTS SA	Undetermined	4 <input type="checkbox"/>
JP5539516B2 2010-08-03	Fuel cell / Super capacitor / Battery power system for vehicle propulsion	BY ROSALINDA MARTIENSSEN WERNER OSKAR MARTIENSSEN DECEASED	Expired - Fee Related	4 <input type="checkbox"/>
DE102018211717B4 2018-07-13	Accumulator arrangement, vehicle electrical system and motor vehicle	BAYERISCHE MOTOREN WERKE AG	Active	4 <input type="checkbox"/>
CN117996150A 2023-04-26	All-solid-state battery and vehicle including the same	HYUNDAI MOTOR CO	Pending	4 <input type="checkbox"/>

*For patents the filing date is used, and for NPL the publication date is used.

Enterprise Patent Activity

The Ultimate Parent Entities from the Peer Group have a direct connection with the inventive ideas expressed in the Invention Description. This indicates these Parent Entities are involved with the Invention Description's product or technology area. Parent Entities with a greater number of patents have invested heavily in this area, including identified subsidiaries and acquisitions, indicating they consider this technology segment to be of high commercial interest. Entities that are prolific may prefer litigation to licensing, while the less invested entities may welcome the opportunity to license. The table on this page other than your parent entities teaches the names of the enterprises that may be, now or in the future, competitors, collaborators, licensees, or licensors. The company names, along with total count, are selected from the most semantically relevant patents or applications up to the [Document Count](#).

#	ULTIMATE PARENT	EARLIEST PRIORITY DATE	TOTAL COUNT
1.	DR B VIKRAM BABU	2021-07-20	1
2.	DR G ADILAKSHMI	2021-07-20	1
3.	DR GANGANAGUNTA SRINIVAS	2021-07-20	1
4.	DR K NEERAJA	2021-07-20	1
5.	DR K SRINIVASA RAO	2021-07-20	1
6.	DR KARTIK N SHINDE	2021-07-20	1
7.	DR KARUMANCHI EPHRAIM BABU	2021-07-20	1
8.	DR SRIVASTAVA PRATIMA KUMARI	2021-07-20	1
9.	DR TIRUMALASETTY CHIRANJEEVI	2021-07-20	1
10.	MR NELLORE MANOJ KUMAR	2021-07-20	1
11.	MR VENKATESWARA RAO RONIKI	2021-07-20	1
12.	MRS SIVA JYOTHI SINGARAJU	2021-07-20	1
13.	PREMERGY INC	2017-02-08	4
14.	DYSON UK HLDG LTD	2011-04-01	5
15.	TOYOTA MOTOR CORP	2011-05-27	16
16.	DYSON TECH LTD	2017-09-15	1
17.	HUANENG CLEAN ENERGY RSCH INST	2021-05-12	1
18.	HUAQING CHUCHUANG TECH CO LTD	2021-05-12	1
19.	上海屹▲り▼新能源科技有限公司	2021-09-01	1
20.	SUBARU CORP	2021-04-14	1
21.	SHANGHAI FIRM LITHIUM NEW ENERGY TECH CO LTD	2021-09-01	1
22.	MURATA MFG CO LTD	2016-11-16	2
23.	DR MUTHUVEL P	2023-10-16	1
24.	KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION	2023-10-16	1
25.	KRISHNANKOIL	2023-10-16	1
26.	VIRUDHUNAGAR INDIA	2023-10-16	1
27.	JIANGSU XINGJIE GUBANG ENERGY TECH CO LTD	2021-05-19	1
28.	RIVIAN IP HLDG LLC	2023-07-25	1
29.	HONDA MOTOR CO LTD	2021-09-29	4
30.	ARTS ENERGY	1998-04-09	1
31.	PANASONIC HLDG CORP	2017-04-04	2
32.	DAIMLER TRUCK HLDG AG	2022-12-22	1
33.	BAYERISCHE MOTOREN WERKE AG	2018-07-13	2
34.	SHANGHAI JIDU AUTOMOBILE CO LTD	2022-03-07	1
35.	CHONGQING CHANGAN AUTOMOBILE CO LTD	2024-04-01	1
36.	GENERAL MOTORS CO	2013-03-12	4
37.	BAODING GREAT WALL HLDG GROUP CO LTD	2017-09-11	1
38.	SHANGHAI AUTOMOTIVE IND CORP GROUP CORP	2023-05-12	1
39.	TERAWATT TECH INC	2018-12-28	1

Enterprise Patent Activity (Continued)

#	ULTIMATE PARENT	EARLIEST PRIORITY DATE	TOTAL COUNT
40.	PORSCHE AUTOMOBIL HLDG SE	2020-03-16	3
41.	OC OERLIKON CORP AG	2020-07-03	1
42.	ECARPLUG CO LTD	2021-06-29	1
43.	COORSTEK INC	2013-05-30	1
44.	MOYER ELMO E	1980-05-05	1
45.	REIMERS EBERHART	1980-05-05	1
46.	HYUNDAI MOTOR CO	2014-12-04	7
47.	SUNWODA ELTNC CO LTD	2020-04-14	1
48.	RENAULT SA	2019-09-06	2
49.	SHENZHEN DEREN ELTNC CO LTD	2013-11-14	1
50.	KIA CORP	2020-06-09	3
51.	ROBERT BOSCH GMBH	2016-12-08	2
52.	CHONGQING JINKANG POWERTRAIN NEW ENERGY CO LTD	2018-10-22	1
53.	NTN CORP	2020-10-21	1
54.	BY ROSALINDA MARTIENSSEN WERNER OSKAR MARTIENSSEN...	2009-08-07	1
55.	EVATEC ADV TECH AG	2009-08-07	1
56.	WERNER OSKAR MARTIENSSEN DECEASED BY ROSALINDA MA...	2009-08-07	1
57.	BEIJING INST TECH BIT	2013-12-13	1
58.	DR R K KUMAWAT	2023-05-23	1
59.	DR Y N VIJAYA KUMAR	2023-05-23	1
60.	PROF PRASHANT ADSULE	2023-05-23	1
61.	IDEMITSU KOSAN CO LTD	2006-10-20	1
62.	NISSAN MOTOR CO LTD	2019-09-13	1
63.	HATANAKA HIROMI	2020-01-07	1
64.	IONTRA INC	2021-09-28	1
65.	APTIV PLC	2010-07-16	1
66.	CPS TECH HLDG LLC	2018-10-30	1
67.	YINGAOCHUANG CO LTD	2021-09-28	1
68.	FORD MOTOR CO	2023-01-17	1
69.	DENSO CORP	2013-08-22	1
70.	ABHISHEK JAIN	2022-08-10	1
71.	DR NEERAJ KUMAR SINGH	2022-08-10	1
72.	DR SUBASH RANJAN KABAT	2022-08-10	1
73.	DR SUBRAHMANYAM VOORE	2022-08-10	1
74.	PINKI SAGAR	2022-08-10	1
75.	PRONIKA CHAWLA	2022-08-10	1
76.	SHIV CHARAN PURI	2022-08-10	1
77.	SHRUTI ARYA	2022-08-10	1
78.	MERCEDES BENZ GROUP AG	2019-07-15	1
79.	KOREA ELEC TERMINAL CO LTD	2013-11-27	1
80.	OSHKOSH CORP	2019-04-30	1
81.	EVJAM LLC	2022-10-28	1
82.	JIANGSU ZENIO NEW ENERGY BATTERY TECH CO LTD	2018-03-27	1
83.	FORD MOTOR CO LTD	1992-12-21	1
84.	KERUIISHI ADV SOLUTIONS CO LTD	2010-06-14	1

Glossary

Document Count	The document count is determined using the lower of the peer group size and user specified maximum after limiting by the user selected patent family (i.e. simple or extended).
Enforceability	Enforceability status provides insight into the legal status of patents and patent applications. This status speaks to whether a patent is enforceable by taking into consideration legal events including maintenance payments and the expiration dates of issued patents, and provides the status of a patent application as to whether it is granted, pending, or has been abandoned. The legal status may change in certain situations, e.g., reinstated patent, and the enforceability status does not consider statute of limitations in its calculation.
Peer Group	The Peer Group is a set of global patent and non-patent literature (NPL) documents that are semantically and conceptually related to the inventive ideas embodied in the Invention Description. This set is based on the collections defined. To avoid repeated publications in one or multiple authorities, only one document from a simple patent family is included.
Ultimate Parent	Ultimate Parent seeks to reflect the topmost owner(s) of a patent. S&P corporate data is used to find the top company within a corporate hierarchy. If a current assignee is not matched to a S&P entity, it is promoted to the Ultimate Parent field. Ultimate Parent may change over the life of the patent; our system seeks to reflect current value.
Weighted Moving Average	The Patents Filing Trend depicts a Weighted Moving Average as a red line. The weighted moving average applied is a two-sided moving average. It is the weighted mean of data points equally positioned on either side of the point in the series where the mean is calculated, with multiplying factors giving different weights to the data points at different positions in the sample window. Normally data points that are closer to the center of the sample window get higher weights than those further away from the center.
