

# Fahad

## List of Publications by Year in Descending Order

**Source:** <https://exaly.com/author-pdf/7636242/fahad-publications-by-year.pdf>

**Version:** 2024-04-25

This document has been generated based on the publications and citations recorded by exaly.com. For the latest version of this publication list, visit the link given above.

The third column is the impact factor (IF) of the journal, and the fourth column is the number of citations of the article.

124  
papers

5,533  
citations

44  
h-index

72  
g-index

129  
ext. papers

6,960  
ext. citations

8  
avg, IF

6.7  
L-index

#	Paper	IF	Citations
124	Feasibility study for the integration of optical filtration and nano-enhanced phase change materials to the conventional PV-based solar systems. <i>Renewable Energy</i> , <b>2022</b> , 187, 463-483	8.1	1
123	Exploring the potential of MXene-based advanced solar-absorber in improving the performance and efficiency of a solar-desalination unit for brackish water purification. <i>Desalination</i> , <b>2022</b> , 526, 115521	10.3	6
122	Energy, exergy, economic and environmental (4E) analysis of a parabolic trough solar collector using MXene based silicone oil nanofluids. <i>Solar Energy Materials and Solar Cells</i> , <b>2022</b> , 239, 111633	6.4	11
121	Grid Integration Challenges and Solution Strategies for Solar PV Systems: A Review. <i>IEEE Access</i> , <b>2022</b> , 1-1	3.5	9
120	Multiwalled CNT and graphene nanoplatelets based nano-enhanced PCMs: Evaluation for the thermal performance and its implications on the performance of hybrid PV/thermal systems. <i>Materials Today Communications</i> , <b>2022</b> , 31, 103618	2.5	0
119	Comparison of physical properties enhancement in various heat transfer nanofluids by MXene <b>2022</b> , 131-150		0
118	Perovskite-based tandem solar cells: Device architecture, stability, and economic perspectives. <i>Renewable and Sustainable Energy Reviews</i> , <b>2022</b> , 165, 112553	16.2	1
117	Effects of carbon-based fillers on thermal properties of fatty acids and their eutectics as phase change materials used for thermal energy storage: A Review. <i>Journal of Energy Storage</i> , <b>2021</b> , 35, 102329	7.8	15
116	Critical analysis of the limitations and validity of the assumptions with the analytical methods commonly used to determine the photovoltaic cell parameters. <i>Renewable and Sustainable Energy Reviews</i> , <b>2021</b> , 140, 110753	16.2	9
115	Economic analysis of a novel solar-assisted air conditioning system with integral absorption energy storage. <i>Journal of Cleaner Production</i> , <b>2021</b> , 291, 125918	10.3	3
114	Renewable Portfolio Standard Development Assessment in the Kingdom of Saudi Arabia from the Perspective of Policy Networks Theory. <i>Processes</i> , <b>2021</b> , 9, 1123	2.9	5
113	Optical and conductivity studies of polyvinyl alcohol-MXene (PVA-MXene) nanocomposite thin films for electronic applications. <i>Optics and Laser Technology</i> , <b>2021</b> , 136, 106772	4.2	13
112	Performance and exergoeconomic assessment of a novel combined ejector cooling with humidification-dehumidification (HDH) desalination system. <i>Desalination</i> , <b>2021</b> , 500, 114843	10.3	6
111	Investigation of the performance of a hybrid PV/thermal system using water/silver nanofluid-based optical filter. <i>Energy</i> , <b>2021</b> , 215, 119172	7.9	10
110	Extreme learning machine for real-time damping of LFO in power system networks. <i>Electrical Engineering</i> , <b>2021</b> , 103, 279-292	1.5	4
109	State-of-the-art ionic liquid & ionanofluids incorporated with advanced nanomaterials for solar energy applications. <i>Journal of Molecular Liquids</i> , <b>2021</b> , 336, 116563	6	16
108	A Comparative Study of Cytotoxicity of PPG and PEG Surface-Modified 2-D TiC MXene Flakes on Human Cancer Cells and Their Photothermal Response. <i>Materials</i> , <b>2021</b> , 14,	3.5	2

107	State-of-the-art review on water-based nanofluids for low temperature solar thermal collector application. <i>Solar Energy Materials and Solar Cells</i> , <b>2021</b> , 230, 111220	6.4	12
106	Efficiency enhancement of a solar dish collector operating with a novel soybean oil-based-MXene nanofluid and different cavity receivers. <i>Journal of Cleaner Production</i> , <b>2021</b> , 317, 128430	10.3	6
105	Thermal performance of nanomaterial in solar collector: State-of-play for graphene. <i>Journal of Energy Storage</i> , <b>2021</b> , 42, 103022	7.8	6
104	Thermodynamic performance evaluation of a hybrid ejector cooling and humidification-dehumidification desalination system. <i>Energy Conversion and Management</i> , <b>2020</b> , 225, 113450	10.6	5
103	Optical, stability and energy performance of water-based MXene nanofluids in hybrid PV/thermal solar systems. <i>Solar Energy</i> , <b>2020</b> , 204, 32-47	6.8	46
102	Thermal regulation and performance assessment of a hybrid photovoltaic/thermal system using different combinations of nano-enhanced phase change materials. <i>Solar Energy Materials and Solar Cells</i> , <b>2020</b> , 215, 110645	6.4	20
101	State-of-the-art heat transfer fluids for parabolic trough collector. <i>International Journal of Heat and Mass Transfer</i> , <b>2020</b> , 152, 119541	4.9	66
100	Thermal energy storage and thermal conductivity properties of Octadecanol-MWCNT composite PCMs as promising organic heat storage materials. <i>Scientific Reports</i> , <b>2020</b> , 10, 9168	4.9	12
99	Form-Stabilized Polyethylene Glycol/Palygorskite Composite Phase Change Material: Thermal Energy Storage Properties, Cycling Stability, and Thermal Durability. <i>Polymer Engineering and Science</i> , <b>2020</b> , 60, 909-916	2.3	18
98	Charging and discharging characteristics of absorption energy storage integrated with a solar driven double-effect absorption chiller for air conditioning applications. <i>Journal of Energy Storage</i> , <b>2020</b> , 29, 101374	7.8	7
97	Energetic Performance Optimization of a H <sub>2</sub> O-LiBr Absorption Chiller Powered by Evacuated Tube Solar Collector. <i>Innovative Renewable Energy</i> , <b>2020</b> , 363-377	0.3	
96	Grid Integration Challenges of Wind Energy: A Review. <i>IEEE Access</i> , <b>2020</b> , 8, 10857-10878	3.5	78
95	Numerical investigation of the effects of the nano-enhanced phase change materials on the thermal and electrical performance of hybrid PV/thermal systems. <i>Energy Conversion and Management</i> , <b>2020</b> , 205, 112449	10.6	38
94	A detailed parametric study of a solar driven double-effect absorption chiller under various solar radiation data. <i>Journal of Cleaner Production</i> , <b>2020</b> , 251, 119750	10.3	10
93	Thermal energy storage and thermal conductivity properties of fatty acid/fatty acid-grafted-CNTs and fatty acid/CNTs as novel composite phase change materials. <i>Scientific Reports</i> , <b>2020</b> , 10, 15388	4.9	14
92	Improved Thermophysical Properties and Energy Efficiency of Aqueous Ionic Liquid/MXene Nanofluid in a Hybrid PV/T Solar System. <i>Nanomaterials</i> , <b>2020</b> , 10,	5.4	46
91	Optical properties and stability of water-based nanofluids mixed with reduced graphene oxide decorated with silver and energy performance investigation in hybrid photovoltaic/thermal solar systems. <i>International Journal of Energy Research</i> , <b>2020</b> , 44, 11487-11508	4.5	15
90	Performance optimization of a hybrid PV/T solar system using Soybean oil/MXene nanofluids as A new class of heat transfer fluids. <i>Solar Energy</i> , <b>2020</b> , 208, 124-138	6.8	45

89	Techno-economic study on grid-connected PV system for major cities in Saudi Arabia. <i>E3S Web of Conferences</i> , <b>2020</b> , 173, 02005	0.5	3
88	Investigation of Electrical Conductivity, Optical Property, and Stability of 2D MXene Nanofluid Containing Ionic Liquids. <i>Applied Sciences (Switzerland)</i> , <b>2020</b> , 10, 8943	2.6	9
87	Evaluation of the effects of optical filtration and nanoPCM on the performance of a hybrid photovoltaic-thermal solar collector. <i>Energy Conversion and Management</i> , <b>2019</b> , 195, 139-156	10.6	14
86	Investigation of thermal properties and enhanced energy storage/release performance of silica fume/myristic acid composite doped with carbon nanotubes. <i>Renewable Energy</i> , <b>2019</b> , 140, 779-788	8.1	28
85	Optical behavior of a water/silver nanofluid and their influence on the performance of a photovoltaic-thermal collector. <i>Solar Energy Materials and Solar Cells</i> , <b>2019</b> , 201, 110054	6.4	25
84	Supercooling of phase-change materials and the techniques used to mitigate the phenomenon. <i>Applied Energy</i> , <b>2019</b> , 240, 793-817	10.7	118
83	The potential of energy savings and the prospects of cleaner energy production by solar energy integration in the residential buildings of Saudi Arabia. <i>Journal of Cleaner Production</i> , <b>2018</b> , 183, 1122-1130	10.3	37
82	Evaluation of solar collector designs with integrated latent heat thermal energy storage: A review. <i>Solar Energy</i> , <b>2018</b> , 166, 334-350	6.8	133
81	Enhancement of the Photovoltaic Performance of Dye-Sensitized Solar Cells by Cosensitizing TiO <sub>2</sub> Photoanode With Uncapped PbS Nanocrystals and Ruthenizer. <i>IEEE Journal of Photovoltaics</i> , <b>2018</b> , 8, 512-516	3.7	5
80	Diatomite/CNTs/PEG composite PCMs with shape-stabilized and improved thermal conductivity: Preparation and thermal energy storage properties. <i>Energy and Buildings</i> , <b>2018</b> , 164, 166-175	7	109
79	Silica fume/capric acid-palmitic acid composite phase change material doped with CNTs for thermal energy storage. <i>Solar Energy Materials and Solar Cells</i> , <b>2018</b> , 179, 353-361	6.4	82
78	Carbon nanotube nanofluid in enhancing the efficiency of evacuated tube solar collector. <i>Renewable Energy</i> , <b>2018</b> , 121, 36-44	8.1	142
77	Review of recent developments and persistent challenges in stability of perovskite solar cells. <i>Renewable and Sustainable Energy Reviews</i> , <b>2018</b> , 90, 210-222	16.2	72
76	Comparative Energy and Exergy Analyses of Air Conditioning Systems Integrated with an Air Enthalpy Exchanger for Different Refrigerants. <i>Journal of Energy Engineering - ASCE</i> , <b>2018</b> , 144, 04018025	1.7	2
75	Solar absorption systems with integrated absorption energy storage: A review. <i>Renewable and Sustainable Energy Reviews</i> , <b>2018</b> , 82, 1602-1610	16.2	49
74	Preparation, characterization and thermal regulation performance of cement based-composite phase change material. <i>Solar Energy Materials and Solar Cells</i> , <b>2018</b> , 174, 523-529	6.4	67
73	Effect of Accumulation of Environmental Dust and Subsequent Mud Formation on Textural, Chemical, and Optical Properties of Silicon Wafers for Photovoltaic Cells. <i>IEEE Journal of Photovoltaics</i> , <b>2018</b> , 8, 1274-1280	3.7	5
72	A review on recent development for the design and packaging of hybrid photovoltaic/thermal (PV/T) solar systems. <i>Renewable and Sustainable Energy Reviews</i> , <b>2018</b> , 95, 110-129	16.2	77

71	Energy and Exergy Analyses of Recompression Brayton Cycles Integrated with a Solar Power Tower through a Two-Tank Thermal Storage System. <i>Journal of Energy Engineering - ASCE</i> , <b>2018</b> , 144, 04018036 <sup>1-7</sup>	11
70	Performance analysis of a solar chimney power plant design aided with reflectors. <i>Energy Conversion and Management</i> , <b>2018</b> , 177, 30-42	10.6 15
69	A hybrid renewable energy system as a potential energy source for water desalination using reverse osmosis: A review. <i>Renewable and Sustainable Energy Reviews</i> , <b>2018</b> , 97, 456-477	16.2 93
68	Performance enhancement of dye-sensitized solar cells via cosensitization of ruthenizer Z907 and organic sensitizer SQ2. <i>International Journal of Energy Research</i> , <b>2018</b> , 42, 3957-3965	4.5 17
67	Heat transfer enhancement of phase change materials for thermal energy storage applications: A critical review. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 74, 26-50	16.2 284
66	Transparent Conductive Oxide Films for High-Performance Dye-Sensitized Solar Cells. <i>IEEE Journal of Photovoltaics</i> , <b>2017</b> , 7, 518-524	3.7 8
65	Optical properties of various nanofluids used in solar collector: A review. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 73, 1014-1030	16.2 72
64	Exergoeconomic analysis of ejector-augmented shrouded wind turbines. <i>Energy</i> , <b>2017</b> , 128, 264-270	7.9 4
63	A novel design of a multistage stepped bubble column humidifier for the humidification of air. <i>Applied Thermal Engineering</i> , <b>2017</b> , 120, 530-536	5.8 15
62	Recent progress and remaining challenges in organometallic halides based perovskite solar cells. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 78, 1-14	16.2 39
61	Energy and Exergy Analyses of an Air Membrane Heat and Mass Exchanger for Air Conditioning Applications. <i>Journal of Energy Engineering - ASCE</i> , <b>2017</b> , 143, 04017028	1.7 4
60	Analysis of environmental dust and mud adhesion on aluminum surface in relation to solar energy harvesting. <i>Solar Energy</i> , <b>2017</b> , 153, 590-599	6.8 11
59	Effect of temperature on the photovoltaic performance and stability of solid-state dye-sensitized solar cells: A review. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 79, 946-959	16.2 52
58	Feasibility study of the grid connected 10 MW installed capacity PV power plants in Saudi Arabia. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 80, 319-329	16.2 54
57	A review for phase change materials (PCMs) in solar absorption refrigeration systems. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 76, 105-137	16.2 111
56	Characterization of dust collected from PV modules in the area of Dhahran, Kingdom of Saudi Arabia, and its impact on protective transparent covers for photovoltaic applications. <i>Solar Energy</i> , <b>2017</b> , 141, 203-209	6.8 42
55	Comparative studies of encapsulation and glass surface modification impacts on PV performance in a desert climate. <i>Solar Energy</i> , <b>2017</b> , 142, 288-298	6.8 26
54	A review on current status and challenges of inorganic phase change materials for thermal energy storage systems. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 70, 1072-1089	16.2 308

53	Evaluation of solar thermal driven cooling system in office buildings in Saudi Arabia. <i>E3S Web of Conferences</i> , <b>2017</b> , 23, 05001	0.5	1
52	Experimental testing of the performance of a solar absorption cooling system assisted with ice-storage for an office space. <i>Energy Conversion and Management</i> , <b>2017</b> , 148, 1399-1408	10.6	31
51	Performance characteristics of a solar driven lithium bromide-water absorption chiller integrated with absorption energy storage. <i>Energy Conversion and Management</i> , <b>2017</b> , 150, 188-200	10.6	35
50	Assessment of next generation refrigerants for air conditioning systems integrated with air-membrane heat and mass exchangers. <i>Energy Conversion and Management</i> , <b>2017</b> , 154, 344-353	10.6	4
49	Performance and cost assessment of solar driven humidification dehumidification desalination system. <i>Energy Conversion and Management</i> , <b>2017</b> , 132, 28-39	10.6	69
48	Energy and exergy analyses of solar tower power plant driven supercritical carbon dioxide recompression cycles for six different locations. <i>Renewable and Sustainable Energy Reviews</i> , <b>2017</b> , 68, 153-167	16.2	75
47	Energy analysis of a solar driven cogeneration system using supercritical CO <sub>2</sub> power cycle and MEE-TVC desalination system. <i>Energy</i> , <b>2017</b> , 119, 996-1009	7.9	39
46	Synthesis of zinc oxide/titanium dioxide (ZnO/TiO <sub>2</sub> ) nanocomposites by wet incipient wetness impregnation method and preparation of ZnO/TiO <sub>2</sub> paste using poly(vinylpyrrolidone) for efficient dye-sensitized solar cells. <i>Electrochimica Acta</i> , <b>2016</b> , 222, 473-480	6.7	29
45	Segmented thermoelectric generator: Influence of pin shape configuration on the device performance. <i>Energy</i> , <b>2016</b> , 111, 439-452	7.9	18
44	Entropy, exergy, and cost analyses of solar driven cogeneration systems using supercritical CO <sub>2</sub> Brayton cycles and MEE-TVC desalination system. <i>Energy Conversion and Management</i> , <b>2016</b> , 115, 253-264	10.6	56
43	Electrochemical Impedance Spectroscopy and Photovoltaic Analyses of Dye-Sensitized Solar Cells Based on Carbon/TiO <sub>2</sub> Composite Counter Electrode. <i>Journal of the Electrochemical Society</i> , <b>2016</b> , 163, H339-H342	3.9	16
42	Development of a thermal model for a hybrid photovoltaic module and phase change materials storage integrated in buildings. <i>Solar Energy</i> , <b>2016</b> , 124, 114-123	6.8	79
41	Optimum selection of solar water heating (SWH) systems based on their comparative techno-economic feasibility study for the domestic sector of Saudi Arabia. <i>Renewable and Sustainable Energy Reviews</i> , <b>2016</b> , 62, 336-349	16.2	33
40	On the auxiliary boiler sizing assessment for solar driven supercritical CO <sub>2</sub> double recompression Brayton cycles. <i>Applied Energy</i> , <b>2016</b> , 183, 408-418	10.7	16
39	Performance assessment of water production from solar cooling system in humid climate. <i>Energy Conversion and Management</i> , <b>2016</b> , 127, 647-655	10.6	23
38	An experimental investigation of a novel design air humidifier using direct solar thermal heating. <i>Energy Conversion and Management</i> , <b>2016</b> , 127, 667-678	10.6	10
37	Superhydrophobic surfaces with antireflection properties for solar applications: A critical review. <i>Solar Energy Materials and Solar Cells</i> , <b>2016</b> , 157, 604-623	6.4	83
36	Performance assessment of a solar powered ammonia-water absorption refrigeration system with storage units. <i>Energy Conversion and Management</i> , <b>2016</b> , 126, 316-328	10.6	32

35	Optimization of heliostat field layout in solar central receiver systems on annual basis using differential evolution algorithm. <i>Energy Conversion and Management</i> , <b>2015</b> , 95, 1-9	10.6	50
34	Experimental and numerical performance analysis of a converging channel heat exchanger for PV cooling. <i>Energy Conversion and Management</i> , <b>2015</b> , 103, 14-27	10.6	97
33	Thermoeconomic analysis of shrouded wind turbines. <i>Energy Conversion and Management</i> , <b>2015</b> , 96, 599-604	10.4	15
32	Performance comparison of different supercritical carbon dioxide Brayton cycles integrated with a solar power tower. <i>Energy</i> , <b>2015</b> , 82, 61-71	7.9	164
31	Development of a mathematical model for optimizing a heliostat field layout using differential evolution method. <i>International Journal of Energy Research</i> , <b>2015</b> , 39, 1241-1255	4.5	27
30	Humidification dehumidification desalination system using parabolic trough solar air collector. <i>Applied Thermal Engineering</i> , <b>2015</b> , 75, 809-816	5.8	76
29	Development and assessment of integrating parabolic trough collectors with steam generation side of gas turbine cogeneration systems in Saudi Arabia. <i>Applied Energy</i> , <b>2015</b> , 141, 131-142	10.7	30
28	Exergy analysis of parabolic trough solar collectors integrated with combined steam and organic Rankine cycles. <i>Energy Conversion and Management</i> , <b>2014</b> , 77, 441-449	10.6	156
27	Performance analysis of supercritical CO <sub>2</sub> Brayton cycles integrated with solar central receiver system <b>2014</b> ,		3
26	Techno-economic performance analysis of parabolic trough collector in Dhahran, Saudi Arabia. <i>Energy Conversion and Management</i> , <b>2014</b> , 86, 622-633	10.6	74
25	Techno-economic evaluation of different types of solar collectors for water heating application in domestic sector of Saudi Arabia <b>2014</b> ,		2
24	Time Instant Optimization of a Heliostat Field Using a Heuristic Algorithm <b>2014</b> ,		2
23	Thermoeconomic optimization of three trigeneration systems using organic Rankine cycles: Part II Applications. <i>Energy Conversion and Management</i> , <b>2013</b> , 69, 209-216	10.6	57
22	Impact resistance of composite laminate flat plates [A parametric sensitivity analysis approach. <i>Composite Structures</i> , <b>2013</b> , 102, 138-147	5.3	12
21	Thermoeconomic optimization of three trigeneration systems using organic Rankine cycles: Part I Formulations. <i>Energy Conversion and Management</i> , <b>2013</b> , 69, 199-208	10.6	76
20	Energy and sizing analyses of parabolic trough solar collector integrated with steam and binary vapor cycles. <i>Energy</i> , <b>2013</b> , 58, 561-570	7.9	54
19	Exergy analysis of a high-temperature-steam-driven, varied-pressure, humidification-dehumidification system coupled with reverse osmosis. <i>Applied Energy</i> , <b>2013</b> , 103, 552-561	10.7	37
18	Performance assessment of a novel system using parabolic trough solar collectors for combined cooling, heating, and power production. <i>Renewable Energy</i> , <b>2012</b> , 48, 161-172	8.1	164

17	Energy and exergy analyses of a biomass trigeneration system using an organic Rankine cycle. <i>Energy</i> , <b>2012</b> , 45, 975-985	7.9	124
16	Performance comparison of three trigeneration systems using organic rankine cycles. <i>Energy</i> , <b>2011</b> , 36, 5741-5754	7.9	67
15	Trigeneration: A comprehensive review based on prime movers. <i>International Journal of Energy Research</i> , <b>2011</b> , 35, 233-258	4.5	128
14	Greenhouse gas emission and exergy assessments of an integrated organic Rankine cycle with a biomass combustor for combined cooling, heating and power production. <i>Applied Thermal Engineering</i> , <b>2011</b> , 31, 439-446	5.8	87
13	Exergy modeling of a new solar driven trigeneration system. <i>Solar Energy</i> , <b>2011</b> , 85, 2228-2243	6.8	168
12	Energy and Exergy Assessments of a New Trigeneration System Based on Organic Rankine Cycle and Biomass Combustor <b>2010</b> ,		1
11	Exergy analysis of an integrated solid oxide fuel cell and organic Rankine cycle for cooling, heating and power production. <i>Journal of Power Sources</i> , <b>2010</b> , 195, 2346-2354	8.9	152
10	Energy analysis of a trigeneration plant based on solid oxide fuel cell and organic Rankine cycle. <i>International Journal of Hydrogen Energy</i> , <b>2010</b> , 35, 5104-5113	6.7	153
9	Vibration analysis of drillstrings with self-excited stick-slip oscillations. <i>Journal of Sound and Vibration</i> , <b>2007</b> , 299, 540-558	3.9	122
8	CO2 laser cutting of a carbon/carbon multi-lamelled plain-weave structure. <i>Journal of Materials Processing Technology</i> , <b>2006</b> , 173, 345-351	5.3	42
7	Instrumentation Selection and Uncertainty Analysis for Performance Test of Small Centrifugal Compressors <b>2004</b> , 701		1
6	Design of Small Centrifugal Compressors Performance Test Facility <b>2004</b> , 227		
5	Estimation of monthly average daily and hourly solar radiation impinging on a sloped surface using the isotropic sky model for Dhahran, Saudi Arabia. <i>Renewable Energy</i> , <b>1997</b> , 11, 257-262	8.1	15
4	A survey of energy consumption and failure patterns of residential air-conditioning units in Eastern Saudi Arabia. <i>Energy</i> , <b>1996</b> , 21, 967-975	7.9	13
3	Applications of wind power on the East coast of Saudi Arabia. <i>Renewable Energy</i> , <b>1992</b> , 2, 47-55	8.1	9
2	Experimental investigation of a bubble column humidifier heated through solar energy <b>60</b> , 58-69		3
1	Performance and cost assessment of a solar HDH desalination system integrated with thermal storage: a case study <b>173</b> , 86-104		2