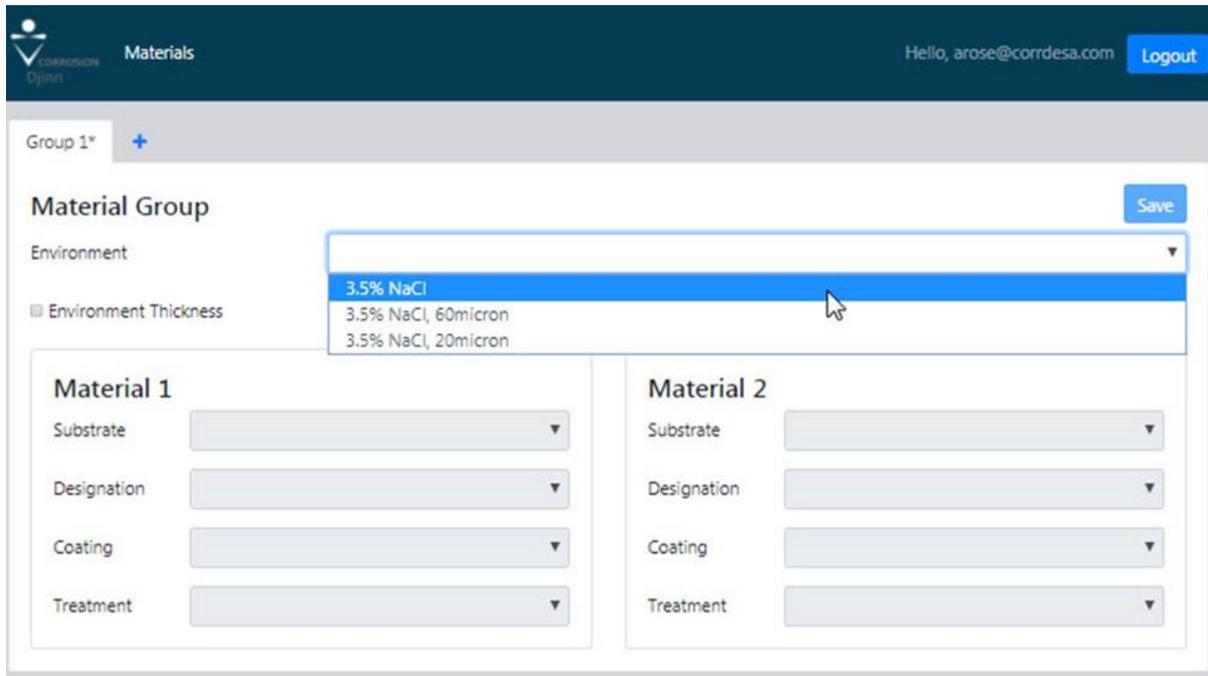
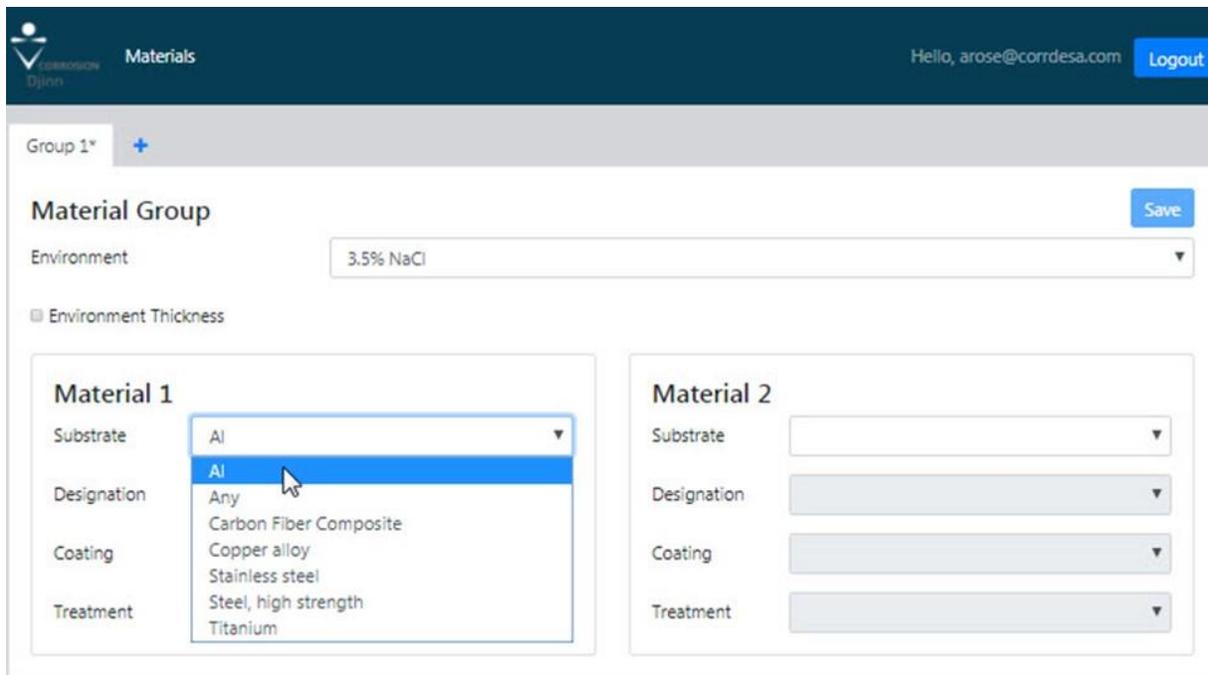


Example Djinn Use case



The screenshot shows the 'Materials' section of the Djinn interface. At the top, there is a header with the Djinn logo, the word 'Materials', the user name 'Hello, arose@corredesa.com', and a 'Logout' button. Below the header, there is a 'Group 1*' label with a plus sign. The main content area is titled 'Material Group' and includes a 'Save' button. The 'Environment' dropdown menu is open, showing three options: '3.5% NaCl' (highlighted), '3.5% NaCl, 60micron', and '3.5% NaCl, 20micron'. Below the environment menu, there are two columns for 'Material 1' and 'Material 2', each with four dropdown menus for 'Substrate', 'Designation', 'Coating', and 'Treatment'.

Figure 1 Choosing environment



The screenshot shows the same 'Materials' section of the Djinn interface. The 'Environment' dropdown menu is now closed and shows '3.5% NaCl'. The 'Material 1' 'Substrate' dropdown menu is open, showing a list of options: 'Al' (highlighted), 'Al', 'Any', 'Carbon Fiber Composite', 'Copper alloy', 'Stainless steel', 'Steel, high strength', and 'Titanium'. The 'Material 2' section remains unchanged with its four dropdown menus.

Figure 2 Substrate

By *substrate* we mean the underlying base material, which could be an element or alloy.

Materials | Hello, arose@corredesa.com | Logout

Group 1* +

Material Group Save

Environment: 3.5% NaCl

Environment Thickness

Material 1

Substrate: Al

Designation: 2024-T3
2219-T81
6061-T6
7075-T6
6061-T6 (rolled sheet)
2024-T3 (rolled sheet)
7075-T6 (rolled sheet)
7050-T7451

Coating:

Treatment:

Material 2

Substrate:

Designation:

Coating:

Treatment:

Figure 3 Designation

If an alloy is being considered, for example, then *designation* allows the user to be a little more specific, permitting the user to specify a particular alloy series or heat treatment.

Materials | Hello, arose@corredesa.com | Logout

Group 1* +

Material Group Save

Environment: 3.5% NaCl

Environment Thickness

Material 1

Substrate: Al

Designation: 7075-T6

Coating: BSAA
None

Treatment:

Material 2

Substrate:

Designation:

Coating:

Treatment:

Figure 4 Coating

The user also has the opportunity to specify a *coating*, which, in the case of Figure 4, would allow the user to specify an *anodized* aluminum alloy.

Figure 5 Treatment

Finally, the user also has an opportunity to specify a *treatment*. For example, in the case of an anodized aluminum alloy, *treatment* allows the user to specify the final “finish” to the anodized such as chromate or hot water rinse etc.

The user then makes selections for the **Second Material** of the couple. Figure 6 shows selections for a material couple comprising *bare* Aluminum alloy 7075-T6, coupled to a 15-5 PH Stainless Steel which has no other coatings or treatments. When satisfied with the materials selections for the first group the user then clicks ‘Save’.

The screenshot shows the 'Materials' section of the Djinn software interface. At the top, there is a header with the Djinn logo, the word 'Materials', and a user greeting 'Hello, arose@corrdesa.com' with a 'Logout' button. Below the header, there is a section for 'Group 1*' with a plus sign. The main area is titled 'Material Group' and contains a 'Save' button in the top right. The environment is set to '3.5% NaCl'. There is a checkbox for 'Environment Thickness'. Below this, there are two columns for material configuration: 'Material 1' and 'Material 2'. Each column has four dropdown menus: 'Substrate', 'Designation', 'Coating', and 'Treatment'. For Material 1, the values are Al, 7075-T6, None, and None. For Material 2, the values are Stainless steel, 15-5 PH, None, and None. The 'None' dropdown for Material 2 is highlighted with a blue border.

Figure 6 Choices for second material in Group 1

The user now chooses the option to *Save*, which provides a plot of the material polarization curves and a summary table of the results for this particular couple, see Figure 7. Djinn annotates each material in the couple as anode and cathode according to their relative OCPs (Open Circuit Potentials), anodic materials having a more negative OCP.

The Djinn electrochemical database also contains material self-corrosion rates and these can be seen for each material, the bare Al-7075 T6 having a *self-corrosion rate* of 18 microns per year compared to the stainless steel 15-5 PH which only has a self-corrosion rate of 0.03 microns/year which is essentially negligible. However, there is a galvanic impact resulting from these particular materials being adjacent to one another, this is reflected in the *galvanic corrosion rate*, of 123 microns/year shown in the summary portion of the table. The inference is that although the aluminum alloy has a self-corrosion rate of 18 microns/year, this is accelerated when in galvanic contact with the 15-5 PH stainless steel to 123 microns/year. This is captured in the reported *Galvanic Acceleration Factor* of 6.7.

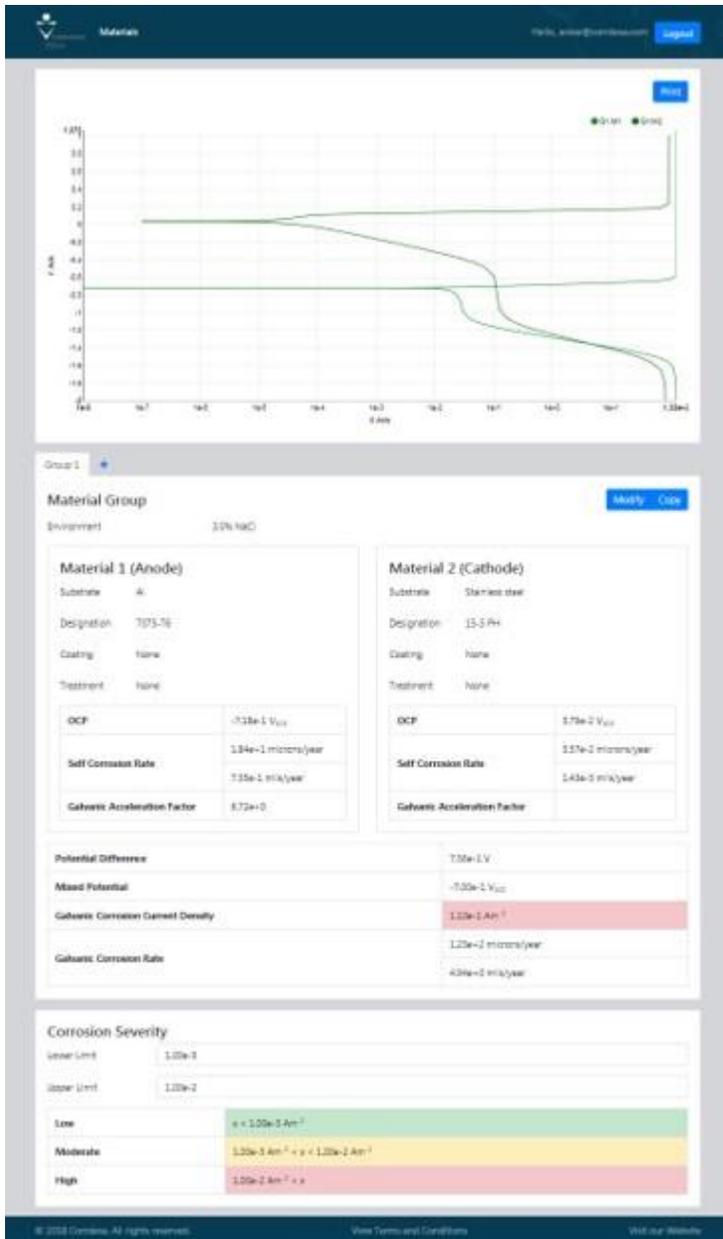


Figure 7 Group 1 results