

Sword steel

What is the Hamon?



We instantly recognize the distinct wavy pattern on a Japanese sword. But what is it? Is this lacquered, bleached or etched? Why is this visible on the sword?

This wavy pattern is called the hamon and it marks the area of the steel that has been hardened so it can be sharpened to a razor sharpness.

I would like to share a few words about the phenomenon which is the hamon. Note that this story is an extremely shortened description and many details are left out to keep it readable. We made these photographs specially for you guys and I hope you can appreciate our efforts.

Did you know that on a Japanese sword, the cutting edge has a different hardness than the spine of the blade?

We appoint this feature as a differentially hardened blade and this feature gives a Japanese sword its ultimate sharpness without doing concessions on flexibility.

Just a quick re-cap for those who are still in their beginning phase of Japanese sword appreciation:

Steel needs to be hardened to receive its strong and rigid features. This process is called the hardening and it's done by heating up the steel to a red-hot color and quickly dip it into water (the quench).

The temperature shock 'scares' the atoms who then quickly grab each other's hands (crystallization). This bonding forms a martensite crystalline structure which basis of the strength of steel.

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When speaking about Japanese swords, the quenching of the sword is called the yaki-ire. It is considered the birth of a Japanese sword as it's the moment the sword receives its soul. However, the hardening is done just a bit different(ial)ly. (<-- metallurgists joke, let me know if you got it right away)

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Before the quench, the back side of the sunobe (unhardened sword blank) is covered in clay. The clay will function as an insulation and will try to protect the steel from cooling down during the quench.

Now, the atoms in the spine of the sword won't get scared as much as the guys in the front so they won't start holding hands. The result? This steel will stay more soft and flexible since there were no really scared atoms (no crystallization)!

So we've got scared atoms holding hands on front at the cutting edge. These guys represent the hamon, the hardened part of the blade.

The ones on the back are still (kinda) relaxed. Some are holding hands, but most aren't. The overall hardness of the steel is much lower than the hamon area. This area is called the Ji. The separation line between the back and the front is called the habuchi.

While the habuchi line can often be seen on an unpolished blade, the difference between the hard and the soft steel is much more difficult to see. To make this visible for the naked eye, the steel needs to be put through a dozen of polishing steps.

Japanese sword polishing is essentially based on one rule: let's replace these polishing scratches with some finer scratches.

While the principle may seem simple, I can assure you that it isn't. The diversity in steel hardness in a sword, the habuchi dividing line between the hard and soft parts, thousands of steel layers and every sword is unique in terms of steel hardness and chemical contents. A sword polisher requires a wide range of polishing stones suitable for each hardness AND the knowledge to determine which stone to use.

He starts by examining the geometry and determines if it must be adjusted. Bends are straightened and the polisher can start removing chips and resetting the geometric lines and if needed, re-sharpen the blade.

After the geometry of the sword has been restored, the polisher can start focusing on bringing back the beauty of the sword (the shiage process).

For this process we cannot use artificial stones. Also modern polishing methods such as abrasive paper or chemical compounds are out of the question.

Artificial stones or chemicals have one effect that every sword polisher wants to avoid: making the surface just shiny.

A true Japanese sword should not be mirror shiny. Traditional Japanese polishing stones have a unique effect on steel; they leave a matte surface, causing a diffuse light reflection on the steel.

Only this will allow you to see through the steel and witness the hidden beauty of a forged and folded Japanese sword. The steel color, the layers, the folding patterns and many unique details in the hamon.

To enhance some details in the hamon, it's possible to polish it with a unique type of stone called hazuya (which is split uchigumori).

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The unique effects of hazuya and the way the pieces are used, create a micro scratching pattern on the hamon. All these scratches together will form a milky white surface which gives a the hamon of a Japanese sword its distinctive white look. This type of polishing is called keisho hadori.

On the left: a really zoomed in picture of the hamon.

On the right: a flowing gunome (wave) hamon. The habuchi clearly dividing the whitened hamon area and the darker ji area

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